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<110> Borns, Michael

<120> DNA Polymerase Fusions and Uses Thereof

<130> 25436/2382

<140> US 10/805,650

<141> 2004-03-19

<150> US 60/457,426

<151> 2003-03-25

<160> 148

<170> PatentIn version 3.1

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<213> Artificial sequence

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<223> primer

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<210> 2

<211> 30

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<213> Artificial sequence

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<223> primer

<400> 2

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<220>
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<210> 13
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<220>
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 <222> (1)..(1)
 <223> 5'-phosphate

<220>
 <221> misc_feature
 <222> (16)..(18)
 <223> NNK where N=any nucleotide

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37

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<222> (1)..(1)
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<400> 26
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<210> 27
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<212> DNA
<213> Pyrococcus furiosus

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<222> (277)..(279)
<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN
INE)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga 180
aagattgtga gaattggtga tgtagagaag gttgagaaaa agtttctcgg caagcctatt 240
accgtgtgga aactttattt ggaacatccc caagatnnnc ccactattag agaaaaagtt 300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac 360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgccttc 420
gatatagaaa ccctctatca cgaaggagaa gagtttggaa aaggcccaat tataatgatt 480
agttatgcag atgaaaatga agcaaagggtg attacttggg aaaacataga tcttccatac 540

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aaaagggcag	aaaaacttgg	gattaaatta	accattggaa	gagatggaag	cgagcccaag	720
atgcagagaa	taggcgatat	gacggctgta	gaagtcaagg	gaagaataca	tttcgacttg	780
tatcatgtaa	taacaaggac	aataaatctc	ccaacataca	cactagaggc	tgtatatgaa	840
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agtggagaga	accttgagag	agttgccaaa	tactcgatgg	aagatgcaaa	ggcaacttat	960
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cccgatactc	taaatcttga	gggatgcaag	aactatgata	tcgctcctca	agtaggccac	1320
aagttctgca	aggacatccc	tggttttata	ccaagtctct	tgggacattt	gttagaggaa	1380
agacaaaaga	ttaagacaaa	aatgaaggaa	actcaagatc	ctatagaaaa	aatactcctt	1440
gactatagac	aaaaagcgat	aaaactctta	gcaaattctt	tctacggata	ttatggctat	1500
gcaaaagcaa	gatggtactg	taaggagtgt	gctgagagcg	ttactgcctg	gggaagaaag	1560
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ggatacatag	tacttagagg	cgatggtcca	attagcaata	gggcaattct	agctgaggaa	2160
tacgatccca	aaaagcacia	gtatgacgca	gaatattaca	tggagaacca	ggttcttcca	2220
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<210> 28

<211> 2328

<212> DNA

<213> Pyrococcus furiosus

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga	180
aagattgtga gaattgttga ttagagagaag gttgagaaaa agtttctcgg caagcctatt	240
accgtgtgga aactttatatt ggaacatccc caagatnnnc ccactattag agaaaaagtt	300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac	360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgccttc	420
gatatagaaa ccctctatca cgaaggagaa gagtttggaa aaggcccaat tataatgatt	480
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gttgagggtt tatcaagcga gagagagatg ataaagagat ttctcaggat tatcagggag	600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg	660
aaaagggcag aaaaacttgg gattaaatta accattggaa gagatggaag cgagcccaag	720
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tatcatgtaa taacaaggac aataaatctc ccaacataca cactagaggc tgtatatgaa	840
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gcggtactta ggatattgga gggatttgga tacagaaagg aagacctcag ataccaaaag	2280
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 <213> *Pyrococcus furiosus*

<220>
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 <222> (1161)..(1161)
 <223> N = C, G, A, or T

<220>
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 <222> (277)..(279)
 <223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga	180

aagattgtga gaattggtga tgtagagaag gttgagaaaa agtttctcgg caagcctatt	240
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<210> 30
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 <212> DNA
 <213> Pyrococcus furiosus

<220>
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 <222> (1161)..(1161)
 <223> N= A,T,C or G

<220>
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 <222> (277)..(279)
 <223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga	180
aagattgtga gaattgttga tgtagagaag gttgagaaaa agtttctcgg caagcctatt	240
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gctctagaat ttgtaaaata cataaattca aagctccctg gactgctaga gcttgaatat	1740
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gtgagaatag taaaagaagt aatacaaaag cttgccatt atgaaattcc accagagaag	1980
ctcgcaatat atgagcagat aacaagacca ttacatgagt ataaggcgat aggtcctcac	2040
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<210> 31
 <211> 2328
 <212> DNA
 <213> *Pyrococcus furiosus*

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<220>
<221> misc_feature
<222> (423)..(423)
<223> N = C, G, A, or T

<220>
<221> misc_feature
<222> (429)..(429)
<223> N = C, G, A, or T

<220>
<221> misc_feature
<222> (277)..(279)
<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN
      INE)

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cttctcaggg atgattcaaa gattgaagaa gttaagaaaa taacggggga aaggcatgga      180
aagattgtga gaattggtga tgtagagaag gttgagaaaa agtttctcgg caagcctatt      240
accgtgtgga aactttattt ggaacatccc caagatnnnc ccactattag agaaaaagtt      300
agagaacatc cagcagttgt ggacatcttc gaatacgata ttccatttgc aaagagatac      360
ctcatcgaca aaggcctaata accaatggag ggggaagaag agctaaagat tcttgccttc      420
gcnatagcna ccctctatca cgaaggagaa gagtttgga aaggcccaat tataatgatt      480
agttatgcag atgaaaatga agcaaagggtg attacttgga aaaacataga tcttccatac      540
gttgagggttg tatcaagcga gagagagatg ataaagagat ttctcaggat tatcagggag      600
aaggatcctg acattatagt tacttataat ggagactcat tcgcattccc atatttagcg      660
aaaagggcag aaaaacttgg gattaaatta accattggaa gagatggaag cgagcccaag      720
atgcagagaa taggcgatat gacggctgta gaagtcaagg gaagaataca ttctgacttg      780
tatcatgtaa taacaaggac aataaatctc ccaacataca cactagaggc tgtatatgaa      840
gcaatttttg gaaagccaaa ggagaaggta tacgccgacg agatagcaaa agcctgggaa      900
agtggagaga accttgagag agttgccaaa tactcgatgg aagatgcaaa ggcaacttat      960
gaactcggga aagaattcct tccaatggaa attcagcttt caagattagt tggacaacct     1020
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gcctacgaaa gaaacgaagt agctccaaac aagccaagtg aagaggagta tcaaagaagg     1140
ctcagggaga gctacacagg tggattcggt aaagagccag aaaagggggt gtgggaaaac     1200

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aagttctgca aggacatccc tggttttata ccaagtctct tgggacattt gttagaggaa 1380
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gctctagaat ttgtaaaata cataaattca aagctccctg gactgctaga gcttgaatat 1740
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gcggtactta ggatattgga gggatttgga tacagaaagg aagacctcag ataccaaaag 2280
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<210> 32
<211> 2328
<212> DNA
<213> Pyrococcus furiosus

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<220>
<221> misc_feature
<222> (423)..(423)
<223> N = C, G, A, or T

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<220>
<221> misc_feature
<222> (429)..(429)
<223> N = C, G, A, or T

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<220>
<221> misc_feature
<222> (277)..(279)

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<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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cttctcaggg	atgattcaaa	gattgaagaa	gttaagaaaa	taacggggga	aaggcatgga	180
aagattgtga	gaattgttga	tgtagagaag	gttgagaaaa	agtttctcgg	caagcctatt	240
accgtgtgga	aactttattt	ggaacatccc	caagatnnnc	ccactattag	agaaaaagtt	300
agagaacatc	cagcagttgt	ggacatcttc	gaatacgata	ttccatttgc	aaagagatac	360
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gcnatagcna	ccctctatca	cgaaggagaa	gagtttggaa	aaggcccaat	tataatgatt	480
agttatgcag	atgaaaatga	agcaaaggtg	attacttgga	aaaacataga	tcttccatac	540
gttgaggttg	tatcaagcga	gagagagatg	ataaagagat	ttctcaggat	tatcagggag	600
aaggatcctg	acattatagt	tacttataat	ggagactcat	tcgcattccc	atatttagcg	660
aaaagggcag	aaaaacttgg	gattaaatta	accattggaa	gagatggaag	cgagcccaag	720
atgcagagaa	taggcgatat	gacggctgta	gaagtcaagg	gaagaataca	tttcgacttg	780
tatcatgtaa	taacaaggac	aataaatctc	ccaacataca	cactagaggc	tgtatatgaa	840
gcaatttttg	gaaagccaaa	ggagaaggta	tacgccgacg	agatagcaaa	agcctgggaa	900
agtggagaga	accttgagag	agttgccaaa	tactcgatgg	aagatgcaaa	ggcaacttat	960
gaactcggga	aagaattcct	tccaatggaa	attcagcttt	caagattagt	tggacaacct	1020
ttatgggatg	tttcaaggtc	aagcacaggg	aaccttgtag	agtggttctt	acttaggaaa	1080
gcctacgaaa	gaaacgaagt	agctccaaac	aagccaagtg	aagaggagta	tcaaagaagg	1140
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tacgatccca aaaagcacia gtatgacgca gaatattaca tggagaacca ggttcttcca	2220
gcggtactta ggatattgga gggatttgga tacagaaagg aagacctcag ataccaaaag	2280
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<210> 33
 <211> 2325
 <212> DNA
 <213> Thermococcus kodakaraensis

 <220>
 <221> misc_feature
 <222> (277)..(279)
 <223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

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ctcctgaagg acgattctgc cattgaggaa gtcaagaaga taaccgccga gaggcacggg	180
acggttgtaa cggttaagcg ggttgaaaag gttcagaaga agttcctcgg gagaccagtt	240
gaggtctgga aactctactt tactcatccg caggacnnnc cagcgataag ggacaagata	300
cgagagcatc cagcagttat tgacatctac gagtacgaca tacccttcgc caagcgctac	360
ctcatagaca agggattagt gccaatggaa ggcgacgagg agctgaaaat gctcgccttc	420
gacattgaaa ctctctacca tgagggcgag gagttcgccg aggggccaat ccttatgata	480
agctacgccg acgaggaagg ggccaggggtg ataacttgga agaacgtgga tctcccctac	540
gttgacgtcg tctcgacgga gagggagatg ataaagcgct tcctccgtgt tgtgaaggag	600
aaagaccggg acgttctcat aacctacaac ggcgacaact tcgacttcgc ctatctgaaa	660

aagcgctgtg	aaaagctcgg	aataaacttc	gccctcggaa	gggatggaag	cgagccgaag	720
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<210> 34
 <211> 2325
 <212> DNA
 <213> *Thermococcus kodakaraensis*

<220>
 <221> misc_feature
 <222> (277)..(279)
 <223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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 ctctgaagg acgattctgc cattgaggaa gtcaagaaga taaccgccga gaggcacggg 180
 acggttgtaa cggttaagcg ggttgaaaag gttcagaaga agttcctcgg gagaccagtt 240
 gaggtctgga aactctactt tactcatccg caggacnnnc cagcgataag ggacaagata 300
 cgagagcatc cagcagttat tgacatctac gagtacgaca tacccttcgc caagcgctac 360
 ctcatagaca agggattagt gccaatggaa ggcgacgagg agctgaaaat gctcgccttc 420
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 attcagagga tgggcgacag gtttgccgtc gaagtgaagg gacggataca cttcgatctc 780
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 gagcttgagg aggagttcct tccgatggag gccagcttt ctcgcttaat cggccagtcc 1020
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 ttctgcaagg acttcccagg atttatccc agcctgcttg gagacctcct agaggagagg 1380

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cagaagataa agaagaagat gaaggccacg attgacccga tcgagaggaa gctcctcgat 1440
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gttgagagaa ttctgagagc cttcggttac cgcaaggaag acctgcgcta ccagaagacg 2280
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<210> 35

<211> 2325

<212> DNA

<213> *Thermococcus litoralis*

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGININE)

<400> 35

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cttctcaaag atgactccgc tattgaggag ataaaggcaa taaagggcga gagacatgga 180
aaaactgtga gagtgctcga tgcagtgaag gtcaggaaaa aatttttggg aagggaagtt 240
gaagtctgga agctcatttt cgagcatccc caagacnnnc cagctatgcg gggcaaaata 300
agggaacatc cagctgtggg tgacatttac gaatatgaca taccctttgc caagcgttat 360
ctcatagaca agggcttgat tcccatggag ggagacgagg agcttaagct ccttgccttt 420

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gaaaatatca	tttatTTTgga	tttccgcagt	ctgtaccctt	caataatagt	tactcacaac	1260
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cctcatgtcg	cgatagcaaa	aagacttgcc	gcaagaggga	taaaagtgaa	accgggcaca	2100

ataataagct atacggttct caaagggagc ggaaagataa gcgatagggc aatttttactt	2160
acagaatacg atcctagaaa acacaagtac gatccggact actacataga aaaccaagtt	2220
ttgccggcag tacttaggat actcgaagcg tttggataga gaaaggagga ttttaaggat	2280
caaagctcaa aacaaaccgg cttagatgca tggctcaaga ggtag	2325

<210> 36
 <211> 2325
 <212> DNA
 <213> Thermococcus litoralis

<220>
 <221> misc_feature
 <222> (277)..(279)
 <223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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<212> DNA
<213> Pyrococcus GB-D

<220>
<221> misc_feature
<222> (277)..(279)
<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN
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<211> 2328

<212> DNA

<213> Pyrococcus GB-D

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<221> misc_feature

<222> (277)..(279)

<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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<210> 39

<211> 2331

<212> DNA

<213> Thermococcus sp.

<220>

<221> misc_feature

<222> (277)..(279)

<223> NNN = AGA, AGG, CGA, CGC, CGG, CGT (ALL POSSIBLE CODONS FOR ARGIN

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<212> DNA

<213> Thermococcus sp.

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<221> misc_feature

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<223> NNN = GAA, GAG (ALL CODONS FOR GLUTAMIC ACID)

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				165					170					175				
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			180					185					190					
Arg	Phe	Leu	Arg	Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr			
		195					200					205						
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu			
	210					215					220							
Lys	Leu	Gly	Ile	Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys			
225					230					235				240				
Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile			
				245					250					255				
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr			
			260					265					270					

Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	275	280	285
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn	290	295	300
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr	305	310	315
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu	320	325	330
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	335	340	345
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala	350	355	360
Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser	365	370	375
Tyr	Thr	Gly	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn	380	385	390
Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	395	400	405
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr	410	415	420
Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly	425	430	435
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	440	445	450
Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu	455	460	465
Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	470	475	480
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	485	490	495
Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu	500	505	510
Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly	515	520	525
Leu	Tyr	Ala	Thr	Ile	Pro	Gly	Gly	Glu	Ser	Glu	Glu	Ile	Lys	Lys	Lys	530	535	540
Ala	Leu	Glu	Phe	Val	Lys	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly	Leu	Leu	545	550	555
																560	565	570

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
 580 585 590
 Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
 625 630 635 640
 Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685
 Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765
 Trp Leu Asn Ile Lys Lys Ser
 770 775

<210> 42
 <211> 775
 <212> PRT
 <213> *Pyrococcus furiosus*

<400> 42

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15
 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60

Ile	Val	Asp	Val	Glu	Lys	Val	Glu	Lys	Lys	Phe	Leu	Gly	Lys	Pro	Ile	
65					70					75					80	
Thr	Val	Trp	Lys	Leu	Tyr	Leu	Glu	His	Pro	Gln	Asp	Glu	Pro	Thr	Ile	
				85					90					95		
Arg	Glu	Lys	Val	Arg	Glu	His	Pro	Ala	Val	Val	Asp	Ile	Phe	Glu	Tyr	
			100					105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
		115					120					125				
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Ile	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
	130					135					140					
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Lys	Gly	Pro	Ile	Ile	Met	Ile	
145					150					155					160	
Ser	Tyr	Ala	Asp	Glu	Asn	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Asn	Ile	
				165					170					175		
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys	
			180					185					190			
Arg	Phe	Leu	Arg	Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr	
		195					200					205				
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu	
	210					215					220					
Lys	Leu	Gly	Ile	Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile	
				245					250					255		
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr	
			260					265					270			
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	
		275					280					285				
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn	
	290					295				300						
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr	
305					310					315					320	
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu	
				325					330					335		
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala	
		355					360					365				

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685
 Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765
 Trp Leu Asn Ile Lys Lys Ser
 770 775

<210> 43
 <211> 775
 <212> PRT
 <213> Pyrococcus furiosus

<400> 43

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15
 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Arg Pro Thr Ile
 85 90 95
 Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile

145					150					155					160
Ser	Tyr	Ala	Asp	Glu	Asn	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Asn	Ile
			165						170					175	
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys
			180					185					190		
Arg	Phe	Leu	Arg	Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr
			195				200					205			
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu
	210					215					220				
Lys	Leu	Gly	Ile	Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys
225					230					235					240
Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile
				245					250					255	
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr
			260					265					270		
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu
			275				280					285			
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn
	290					295					300				
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr
305					310					315					320
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu
				325					330					335	
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu
			340					345					350		
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala
			355				360					365			
Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser
	370					375					380				
Tyr	Thr	Pro	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn
385					390					395					400
Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr
				405					410					415	
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr
			420					425					430		
Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly
		435					440					445			
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile

450		455		460												
Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu	
465					470					475					480	
Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	
				485				490						495		
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	
			500					505					510			
Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu	
		515					520					525				
Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly	
	530					535						540				
Leu	Tyr	Ala	Thr	Ile	Pro	Gly	Gly	Glu	Ser	Glu	Glu	Ile	Lys	Lys	Lys	
545					550					555					560	
Ala	Leu	Glu	Phe	Val	Lys	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly	Leu	Leu	
				565					570					575		
Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	
			580					585					590			
Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Val	Ile	Thr	Arg	Gly	
		595					600					605				
Leu	Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	
	610					615					620					
Ala	Arg	Val	Leu	Glu	Thr	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	
625					630					635					640	
Val	Arg	Ile	Val	Lys	Glu	Val	Ile	Gln	Lys	Leu	Ala	Asn	Tyr	Glu	Ile	
				645					650					655		
Pro	Pro	Glu	Lys	Leu	Ala	Ile	Tyr	Glu	Gln	Ile	Thr	Arg	Pro	Leu	His	
			660					665					670			
Glu	Tyr	Lys	Ala	Ile	Gly	Pro	His	Val	Ala	Val	Ala	Lys	Lys	Leu	Ala	
		675					680					685				
Ala	Lys	Gly	Val	Lys	Ile	Lys	Pro	Gly	Met	Val	Ile	Gly	Tyr	Ile	Val	
	690					695					700					
Leu	Arg	Gly	Asp	Gly	Pro	Ile	Ser	Asn	Arg	Ala	Ile	Leu	Ala	Glu	Glu	
705					710					715					720	
Tyr	Asp	Pro	Lys	Lys	His	Lys	Tyr	Asp	Ala	Glu	Tyr	Tyr	Ile	Glu	Asn	
				725					730					735		
Gln	Val	Leu	Pro	Ala	Val	Leu	Arg	Ile	Leu	Glu	Gly	Phe	Gly	Tyr	Arg	
			740					745					750			
Lys	Glu	Asp	Leu	Arg	Tyr	Gln	Lys	Thr	Arg	Gln	Val	Gly	Leu	Thr	Ser	

755	760	765
Trp Leu Asn Ile Lys Lys Ser		
770	775	
<210> 44		
<211> 775		
<212> PRT		
<213> Pyrococcus furiosus		
<400> 44		
Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile		
1	5	10 15
Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg		
	20	25 30
Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile		
	35	40 45
Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg		
	50	55 60
Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile		
65	70	75 80
Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Arg Pro Thr Ile		
	85	90 95
Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr		
	100	105 110
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro		
	115	120 125
Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Ala Ile Ala Thr		
	130	135 140
Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile		
145	150	155 160
Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile		
	165	170 175
Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys		
	180	185 190
Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr		
	195	200 205
Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu		
	210	215 220
Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys		
225	230	235 240

Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile			
				245					250					255				
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr			
			260					265					270					
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu			
		275					280					285						
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn			
	290					295					300							
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr			
305					310					315					320			
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu			
				325					330					335				
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu			
			340					345					350					
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala			
		355					360					365						
Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser			
	370					375					380							
Tyr	Thr	Gly	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn			
385					390					395					400			
Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr			
				405					410					415				
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr			
			420					425					430					
Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly			
	435						440					445						
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile			
	450					455					460							
Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu			
465					470				475					480				
Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly			
				485				490					495					
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu			
			500					505					510					
Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu			
		515					520					525						
Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly			
	530					535					540							

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
 545 550 555 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
 565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
 580 585 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
 595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
 625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765

Trp Leu Asn Ile Lys Lys Ser
 770 775

<210> 45
 <211> 775
 <212> PRT
 <213> Pyrococcus furiosus

<400> 45

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30

Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala	
			355				360					365				
Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser	
			370			375					380					
Tyr	Thr	Pro	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn	
385					390					395					400	
Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	
				405					410						415	
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr	
			420					425					430			
Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly	
		435					440					445				
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	
	450					455					460					
Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu	
465					470				475						480	
Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	
				485				490						495		
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	
			500					505					510			
Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu	
		515					520					525				
Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly	
	530					535					540					
Leu	Tyr	Ala	Thr	Ile	Pro	Gly	Gly	Glu	Ser	Glu	Glu	Ile	Lys	Lys	Lys	
545					550					555					560	
Ala	Leu	Glu	Phe	Val	Lys	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly	Leu	Leu	
				565					570					575		
Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	
			580					585					590			
Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Val	Ile	Thr	Arg	Gly	
		595					600					605				
Leu	Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	
	610					615					620					
Ala	Arg	Val	Leu	Glu	Thr	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	
625					630					635					640	

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
 675 680 685
 Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
 755 760 765
 Trp Leu Asn Ile Lys Lys Ser
 770 775

<210> 46
 <211> 775
 <212> PRT
 <213> Pyrococcus furiosus

<400> 46

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
 1 5 10 15
 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
 20 25 30
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
 35 40 45
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Arg Pro Thr Ile
 85 90 95
 Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro

115					120					125					
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Ile	Leu	Ala	Phe	Ala	Ile	Ala	Thr
130						135					140				
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Lys	Gly	Pro	Ile	Ile	Met	Ile
145					150					155					160
Ser	Tyr	Ala	Asp	Glu	Asn	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Asn	Ile
				165					170					175	
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys
			180					185					190		
Arg	Phe	Leu	Arg	Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr
		195					200					205			
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu
	210					215					220				
Lys	Leu	Gly	Ile	Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys
225					230					235					240
Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile
				245					250					255	
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr
			260					265					270		
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu
		275					280					285			
Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn
	290					295					300				
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr
305					310					315					320
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu
				325					330					335	
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu
			340					345					350		
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala
		355					360					365			
Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser
	370					375					380				
Tyr	Thr	Gly	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn
385					390					395					400
Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr
				405					410					415	
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr

420						425						430			
Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly
		435					440					445			
Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile
	450					455					460				
Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu
465					470					475					480
Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly
				485					490					495	
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu
			500					505					510		
Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu
		515					520					525			
Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly
	530					535					540				
Leu	Tyr	Ala	Thr	Ile	Pro	Gly	Gly	Glu	Ser	Glu	Glu	Ile	Lys	Lys	Lys
545					550					555					560
Ala	Leu	Glu	Phe	Val	Lys	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly	Leu	Leu
				565					570					575	
Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys
			580					585					590		
Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Val	Ile	Thr	Arg	Gly
		595					600					605			
Leu	Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln
	610					615					620				
Ala	Arg	Val	Leu	Glu	Thr	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala
625					630					635					640
Val	Arg	Ile	Val	Lys	Glu	Val	Ile	Gln	Lys	Leu	Ala	Asn	Tyr	Glu	Ile
				645					650					655	
Pro	Pro	Glu	Lys	Leu	Ala	Ile	Tyr	Glu	Gln	Ile	Thr	Arg	Pro	Leu	His
			660					665					670		
Glu	Tyr	Lys	Ala	Ile	Gly	Pro	His	Val	Ala	Val	Ala	Lys	Lys	Leu	Ala
		675					680					685			
Ala	Lys	Gly	Val	Lys	Ile	Lys	Pro	Gly	Met	Val	Ile	Gly	Tyr	Ile	Val
	690					695					700				
Leu	Arg	Gly	Asp	Gly	Pro	Ile	Ser	Asn	Arg	Ala	Ile	Leu	Ala	Glu	Glu
705					710					715					720
Tyr	Asp	Pro	Lys	Lys	His	Lys	Tyr	Asp	Ala	Glu	Tyr	Tyr	Ile	Glu	Asn

				725						730						735
Gln	Val	Leu	Pro	Ala	Val	Leu	Arg	Ile	Leu	Glu	Gly	Phe	Gly	Tyr	Arg	
			740					745					750			
Lys	Glu	Asp	Leu	Arg	Tyr	Gln	Lys	Thr	Arg	Gln	Val	Gly	Leu	Thr	Ser	
		755					760					765				
Trp	Leu	Asn	Ile	Lys	Lys	Ser										
	770					775										
<210> 47																
<211> 775																
<212> PRT																
<213> Thermococcus sp.																
<400> 47																
Met	Ile	Leu	Asp	Ala	Asp	Tyr	Ile	Thr	Glu	Asp	Gly	Lys	Pro	Ile	Ile	
1				5					10					15		
Arg	Ile	Phe	Lys	Lys	Glu	Asn	Gly	Glu	Phe	Lys	Val	Glu	Tyr	Asp	Arg	
			20					25					30			
Asn	Phe	Arg	Pro	Tyr	Ile	Tyr	Ala	Leu	Leu	Lys	Asp	Asp	Ser	Gln	Ile	
		35					40					45				
Asp	Glu	Val	Arg	Lys	Ile	Thr	Ala	Glu	Arg	His	Gly	Lys	Ile	Val	Arg	
	50					55					60					
Ile	Ile	Asp	Ala	Glu	Lys	Val	Arg	Lys	Lys	Phe	Leu	Gly	Arg	Pro	Ile	
65					70					75					80	
Glu	Val	Trp	Arg	Leu	Tyr	Phe	Glu	His	Pro	Gln	Asp	Arg	Pro	Ala	Ile	
			85						90					95		
Arg	Asp	Lys	Ile	Arg	Glu	His	Ser	Ala	Val	Ile	Asp	Ile	Phe	Glu	Tyr	
		100						105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
		115					120					125				
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Leu	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
	130					135					140					
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Lys	Gly	Pro	Ile	Ile	Met	Ile	
145					150					155					160	
Ser	Tyr	Ala	Asp	Glu	Glu	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Lys	Ile	
			165						170					175		
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys	
		180						185					190			
Arg	Phe	Leu	Lys	Val	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Val	Ile	Ile	Thr	
		195					200					205				

Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Leu	Pro	Tyr	Leu	Val	Lys	Arg	Ala	Glu	210	215	220	
Lys	Leu	Gly	Ile	Lys	Leu	Pro	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	225	230	235	240
Met	Gln	Arg	Leu	Gly	Asp	Met	Thr	Ala	Val	Glu	Ile	Lys	Gly	Arg	Ile	245	250	255	
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	260	265	270	
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	275	280	285	
Lys	Val	Tyr	Ala	His	Glu	Ile	Ala	Glu	Ala	Trp	Glu	Thr	Gly	Lys	Gly	290	295	300	
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr	305	310	315	320
Glu	Leu	Gly	Arg	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	325	330	335	
Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	340	345	350	
Val	Glu	Trp	Tyr	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	355	360	365	
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Tyr	Glu	Arg	Arg	Leu	Arg	Glu	Ser	370	375	380	
Tyr	Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Gly	385	390	395	400
Leu	Val	Ser	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	405	410	415	
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Arg	Glu	Tyr	420	425	430	
Asp	Val	Ala	Pro	Glu	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	435	440	445	
Phe	Ile	Pro	Ser	Leu	Leu	Lys	Arg	Leu	Leu	Asp	Glu	Arg	Gln	Glu	Ile	450	455	460	
Lys	Arg	Lys	Met	Lys	Ala	Ser	Lys	Asp	Pro	Ile	Glu	Lys	Lys	Met	Leu	465	470	475	480
Asp	Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	485	490	495	
Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	500	505	510	

Ser Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Phe Val Arg Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Ala Lys Pro Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu
 565 570 575
 Glu Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys
 580 585 590
 Lys Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu Glu Ala
 625 630 635 640
 Val Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala
 675 680 685
 Ala Arg Gly Val Lys Val Arg Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Phe Asp Leu Arg Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Trp Gln Lys Thr Lys Gln Thr Gly Leu Thr Ala
 755 760 765
 Trp Leu Asn Ile Lys Lys Lys
 770 775

<210> 48
 <211> 775
 <212> PRT
 <213> Thermococcus sp.

<400> 48

Met	Ile	Leu	Asp	Ala	Asp	Tyr	Ile	Thr	Glu	Asp	Gly	Lys	Pro	Ile	Ile	
1				5					10					15		
Arg	Ile	Phe	Lys	Lys	Glu	Asn	Gly	Glu	Phe	Lys	Val	Glu	Tyr	Asp	Arg	
			20					25					30			
Asn	Phe	Arg	Pro	Tyr	Ile	Tyr	Ala	Leu	Leu	Lys	Asp	Asp	Ser	Gln	Ile	
		35					40					45				
Asp	Glu	Val	Arg	Lys	Ile	Thr	Ala	Glu	Arg	His	Gly	Lys	Ile	Val	Arg	
	50					55					60					
Ile	Ile	Asp	Ala	Glu	Lys	Val	Arg	Lys	Lys	Phe	Leu	Gly	Arg	Pro	Ile	
65					70					75					80	
Glu	Val	Trp	Arg	Leu	Tyr	Phe	Glu	His	Pro	Gln	Asp	Glu	Pro	Ala	Ile	
				85					90					95		
Arg	Asp	Lys	Ile	Arg	Glu	His	Ser	Ala	Val	Ile	Asp	Ile	Phe	Glu	Tyr	
			100					105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
		115					120					125				
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Leu	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
	130					135					140					
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Lys	Gly	Pro	Ile	Ile	Met	Ile	
145					150					155					160	
Ser	Tyr	Ala	Asp	Glu	Glu	Glu	Ala	Lys	Val	Ile	Thr	Trp	Lys	Lys	Ile	
				165					170					175		
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Ser	Glu	Arg	Glu	Met	Ile	Lys	
			180					185					190			
Arg	Phe	Leu	Lys	Val	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Val	Ile	Ile	Thr	
		195					200					205				
Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Leu	Pro	Tyr	Leu	Val	Lys	Arg	Ala	Glu	
	210					215					220					
Lys	Leu	Gly	Ile	Lys	Leu	Pro	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
Met	Gln	Arg	Leu	Gly	Asp	Met	Thr	Ala	Val	Glu	Ile	Lys	Gly	Arg	Ile	
				245					250					255		
His	Phe	Asp	Leu	Tyr	His	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	
			260					265					270			
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu	
		275					280					285				

Lys Val Tyr Ala His Glu Ile Ala Glu Ala Trp Glu Thr Gly Lys Gly
 290 295 300
 Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
 305 310 315 320
 Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Tyr Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
 355 360 365
 Pro Asn Lys Pro Asp Glu Arg Glu Tyr Glu Arg Arg Leu Arg Glu Ser
 370 375 380
 Tyr Ala Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly
 385 390 395 400
 Leu Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
 405 410 415
 His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Glu Tyr
 420 425 430
 Asp Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly
 435 440 445
 Phe Ile Pro Ser Leu Leu Lys Arg Leu Leu Asp Glu Arg Gln Glu Ile
 450 455 460
 Lys Arg Lys Met Lys Ala Ser Lys Asp Pro Ile Glu Lys Lys Met Leu
 465 470 475 480
 Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly
 485 490 495
 Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
 500 505 510
 Ser Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Phe Val Arg Lys Glu
 515 520 525
 Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
 530 535 540
 Leu Tyr Ala Thr Ile Pro Gly Ala Lys Pro Glu Glu Ile Lys Lys Lys
 545 550 555 560
 Ala Leu Glu Phe Val Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu
 565 570 575
 Glu Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys
 580 585 590

Lys Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Ile Thr Arg Gly
 595 600 605
 Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
 610 615 620
 Ala Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu Glu Ala
 625 630 635 640
 Val Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile
 645 650 655
 Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
 660 665 670
 Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala
 675 680 685
 Ala Arg Gly Val Lys Val Arg Pro Gly Met Val Ile Gly Tyr Ile Val
 690 695 700
 Leu Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Leu Ala Glu Glu
 705 710 715 720
 Phe Asp Leu Arg Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
 725 730 735
 Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly Tyr Arg
 740 745 750
 Lys Glu Asp Leu Arg Trp Gln Lys Thr Lys Gln Thr Gly Leu Thr Ala
 755 760 765
 Trp Leu Asn Ile Lys Lys Lys
 770 775

<210> 49
 <211> 773
 <212> PRT
 <213> Thermococcus gorgonarius

<400> 49

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
 1 5 10 15
 Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
 20 25 30
 Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
 35 40 45
 Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
 50 55 60
 Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile

65						70						75						80
Glu	Val	Trp	Lys	Leu	Tyr	Phe	Thr	His	Pro	Gln	Asp	Arg	Pro	Ala	Ile			
				85					90					95				
Arg	Asp	Lys	Ile	Lys	Glu	His	Pro	Ala	Val	Val	Asp	Ile	Tyr	Glu	Tyr			
			100					105					110					
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro			
		115					120					125						
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Met	Leu	Ala	Phe	Asp	Ile	Glu	Thr			
		130				135					140							
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Glu	Gly	Pro	Ile	Leu	Met	Ile			
145					150					155					160			
Ser	Tyr	Ala	Asp	Glu	Glu	Gly	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Ile			
				165					170					175				
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys			
			180					185					190					
Arg	Phe	Leu	Lys	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr			
		195					200					205						
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Ser	Glu			
		210				215					220							
Lys	Leu	Gly	Val	Lys	Phe	Ile	Leu	Gly	Arg	Glu	Gly	Ser	Glu	Pro	Lys			
225					230					235					240			
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile			
				245					250					255				
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr			
			260					265					270					
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Gln	Pro	Lys	Glu			
		275					280					285						
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Gln	Ala	Trp	Glu	Thr	Gly	Glu	Gly			
		290				295					300							
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr			
305					310					315					320			
Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu			
				325					330					335				
Val	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu			
			340					345					350					
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala			
		355					360					365						
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Glu	Ser	Tyr			

370		375		380													
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile		
385					390					395					400		
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His		
				405					410					415			
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Glu	Glu	Tyr	Asp		
			420					425					430				
Val	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe		
		435					440					445					
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Val	Lys		
	450					455					460						
Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys	Leu	Leu	Asp		
465					470					475					480		
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	Tyr		
				485					490					495			
Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser		
			500					505					510				
Val	Thr	Ala	Trp	Gly	Arg	Gln	Tyr	Ile	Glu	Thr	Thr	Ile	Arg	Glu	Ile		
		515					520					525					
Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr	Asp	Gly	Phe		
	530					535					540						
Phe	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala		
545					550				555						560		
Lys	Glu	Phe	Leu	Asp	Tyr	Ile	Asn	Ala	Lys	Leu	Pro	Gly	Leu	Leu	Glu		
				565					570					575			
Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	Lys		
			580					585					590				
Lys	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Asp	Lys	Ile	Thr	Thr	Arg	Gly	Leu		
		595					600					605					
Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	Ala		
	610					615					620						
Arg	Val	Leu	Glu	Ala	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	Val		
625					630					635					640		
Arg	Ile	Val	Lys	Glu	Val	Thr	Glu	Lys	Leu	Ser	Lys	Tyr	Glu	Val	Pro		
			645						650					655			
Pro	Glu	Lys	Leu	Val	Ile	Tyr	Glu	Gln	Ile	Thr	Arg	Asp	Leu	Lys	Asp		
		660						665					670				

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
 755 760 765
 Leu Lys Pro Lys Thr
 770

<210> 50
 <211> 773
 <212> PRT
 <213> Thermococcus gorgonarius

<400> 50

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
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 Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
 20 25 30
 Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
 35 40 45
 Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
 50 55 60
 Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
 65 70 75 80
 Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Glu Pro Ala Ile
 85 90 95
 Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
 145 150 155 160

Ser	Tyr	Ala	Asp	Glu	Glu	Gly	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Ile	
				165					170					175		
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys	
			180					185					190			
Arg	Phe	Leu	Lys	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr	
		195					200					205				
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Ser	Glu	
	210					215					220					
Lys	Leu	Gly	Val	Lys	Phe	Ile	Leu	Gly	Arg	Glu	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile	
				245					250					255		
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	
			260					265					270			
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Gln	Pro	Lys	Glu	
		275					280					285				
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Gln	Ala	Trp	Glu	Thr	Gly	Glu	Gly	
	290					295					300					
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr	
305					310					315					320	
Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	
				325					330					335		
Val	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	
		355					360					365				
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Glu	Ser	Tyr	
	370					375					380					
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile	
385					390					395					400	
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His	
				405					410					415		
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Glu	Glu	Tyr	Asp	
			420					425					430			
Val	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe	
		435					440					445				
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Val	Lys	
	450					455					460					

Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys	Leu	Leu	Asp	465	470	475	480
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	Tyr		485	490	495
Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser		500	505	510
Val	Thr	Ala	Trp	Gly	Arg	Gln	Tyr	Ile	Glu	Thr	Thr	Ile	Arg	Glu	Ile		515	520	525
Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr	Asp	Gly	Phe		530	535	540
Phe	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala	545	550	555	560
Lys	Glu	Phe	Leu	Asp	Tyr	Ile	Asn	Ala	Lys	Leu	Pro	Gly	Leu	Leu	Glu		565	570	575
Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	Lys		580	585	590
Lys	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Asp	Lys	Ile	Thr	Thr	Arg	Gly	Leu		595	600	605
Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	Ala		610	615	620
Arg	Val	Leu	Glu	Ala	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	Val	625	630	635	640
Arg	Ile	Val	Lys	Glu	Val	Thr	Glu	Lys	Leu	Ser	Lys	Tyr	Glu	Val	Pro		645	650	655
Pro	Glu	Lys	Leu	Val	Ile	Tyr	Glu	Gln	Ile	Thr	Arg	Asp	Leu	Lys	Asp		660	665	670
Tyr	Lys	Ala	Thr	Gly	Pro	His	Val	Ala	Val	Ala	Lys	Arg	Leu	Ala	Ala		675	680	685
Arg	Gly	Ile	Lys	Ile	Arg	Pro	Gly	Thr	Val	Ile	Ser	Tyr	Ile	Val	Leu		690	695	700
Lys	Gly	Ser	Gly	Arg	Ile	Gly	Asp	Arg	Ala	Ile	Pro	Phe	Asp	Glu	Phe	705	710	715	720
Asp	Pro	Ala	Lys	His	Lys	Tyr	Asp	Ala	Glu	Tyr	Tyr	Ile	Glu	Asn	Gln		725	730	735
Val	Leu	Pro	Ala	Val	Glu	Arg	Ile	Leu	Arg	Ala	Phe	Gly	Tyr	Arg	Lys		740	745	750
Glu	Asp	Leu	Arg	Tyr	Gln	Lys	Thr	Arg	Gln	Val	Gly	Leu	Gly	Ala	Trp		755	760	765

Leu Lys Pro Lys Thr
770

<210> 51
<211> 774
<212> PRT
<213> Thermococcus kodakaraensis

<400> 51

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
20 25 30

Thr Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Val Val Thr
50 55 60

Val Lys Arg Val Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Val
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Arg Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Gly Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Val Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Gln Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Val
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Lys Leu Gly Ile Asn Phe Ala Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile

245							250					255						
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr			
			260					265					270					
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Gln	Pro	Lys	Glu			
		275					280					285						
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Thr	Pro	Ala	Trp	Glu	Thr	Gly	Glu	Asn			
	290					295					300							
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Val	Thr	Tyr			
305					310					315					320			
Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu			
				325					330					335				
Ile	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu			
			340					345					350					
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala			
		355					360					365						
Pro	Asn	Lys	Pro	Asp	Glu	Lys	Glu	Leu	Ala	Arg	Arg	Arg	Gln	Ser	Tyr			
	370					375					380							
Glu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile			
385					390					395					400			
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His			
				405					410					415				
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Lys	Glu	Tyr	Asp			
			420					425					430					
Val	Ala	Pro	Gln	Val	Gly	His	Arg	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe			
		435					440					445						
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	Lys			
	450					455					460							
Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Arg	Lys	Leu	Leu	Asp			
465					470					475					480			
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	Tyr			
				485					490					495				
Tyr	Gly	Tyr	Ala	Arg	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser			
			500					505					510					
Val	Thr	Ala	Trp	Gly	Arg	Glu	Tyr	Ile	Thr	Met	Thr	Ile	Lys	Glu	Ile			
		515					520					525						
Glu	Glu	Lys	Tyr	Gly	Phe	Lys	Val	Ile	Tyr	Ser	Asp	Thr	Asp	Gly	Phe			
	530					535					540							

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560

Met Glu Phe Leu Asn Tyr Ile Asn Ala Lys Leu Pro Gly Ala Leu Glu
 565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
 595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620

Arg Val Leu Glu Ala Leu Leu Lys Asp Gly Asp Val Glu Lys Ala Val
 625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655

Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685

Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720

Asp Pro Thr Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Ser Ala Trp
 755 760 765

Leu Lys Pro Lys Gly Thr
 770

<210> 52
 <211> 774
 <212> PRT
 <213> Thermococcus kodakaraensis

<400> 52

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
 1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
 20 25 30

Ile	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	
		355					360					365				
Pro	Asn	Lys	Pro	Asp	Glu	Lys	Glu	Leu	Ala	Arg	Arg	Arg	Gln	Ser	Tyr	
	370					375					380					
Glu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile	
385					390					395					400	
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His	
			405					410						415		
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Lys	Glu	Tyr	Asp	
			420					425					430			
Val	Ala	Pro	Gln	Val	Gly	His	Arg	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe	
	435						440					445				
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	Lys	
450						455					460					
Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Arg	Lys	Leu	Leu	Asp	
465					470					475					480	
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	Tyr	
				485					490					495		
Tyr	Gly	Tyr	Ala	Arg	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser	
			500					505					510			
Val	Thr	Ala	Trp	Gly	Arg	Glu	Tyr	Ile	Thr	Met	Thr	Ile	Lys	Glu	Ile	
		515					520					525				
Glu	Glu	Lys	Tyr	Gly	Phe	Lys	Val	Ile	Tyr	Ser	Asp	Thr	Asp	Gly	Phe	
	530					535					540					
Phe	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala	
545					550				555						560	
Met	Glu	Phe	Leu	Asn	Tyr	Ile	Asn	Ala	Lys	Leu	Pro	Gly	Ala	Leu	Glu	
				565					570					575		
Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	Lys	
			580					585					590			
Lys	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Ile	Thr	Thr	Arg	Gly	Leu	
		595					600					605				
Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	Ala	
	610					615					620					
Arg	Val	Leu	Glu	Ala	Leu	Leu	Lys	Asp	Gly	Asp	Val	Glu	Lys	Ala	Val	
625					630					635					640	

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Thr Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Ser Ala Trp
 755 760 765
 Leu Lys Pro Lys Gly Thr
 770

<210> 53
 <211> 774
 <212> PRT
 <213> Thermococcus litoralis

<400> 53

Met Ile Leu Asp Thr Asp Tyr Ile Thr Lys Asp Gly Lys Pro Ile Ile
 1 5 10 15
 Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Leu Asp Pro
 20 25 30
 His Phe Gln Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
 35 40 45
 Glu Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Thr Val Arg
 50 55 60
 Val Leu Asp Ala Val Lys Val Arg Lys Lys Phe Leu Gly Arg Glu Val
 65 70 75 80
 Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Arg Pro Ala Met
 85 90 95
 Arg Gly Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro

115					120					125					
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Leu	Leu	Ala	Phe	Asp	Ile	Glu	Thr
130						135					140				
Phe	Tyr	His	Glu	Gly	Asp	Glu	Phe	Gly	Lys	Gly	Glu	Ile	Ile	Met	Ile
145					150					155					160
Ser	Tyr	Ala	Asp	Glu	Glu	Glu	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Ile
				165					170					175	
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Asn	Glu	Arg	Glu	Met	Ile	Lys
			180					185					190		
Arg	Phe	Val	Gln	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Ile	Ile	Thr
		195					200					205			
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Leu	Pro	Tyr	Leu	Ile	Lys	Arg	Ala	Glu
	210					215					220				
Lys	Leu	Gly	Val	Arg	Leu	Val	Leu	Gly	Arg	Asp	Lys	Glu	His	Pro	Glu
225					230					235					240
Pro	Lys	Ile	Gln	Arg	Met	Gly	Asp	Ser	Phe	Ala	Val	Glu	Ile	Lys	Gly
				245					250					255	
Arg	Ile	His	Phe	Asp	Leu	Phe	Pro	Val	Val	Arg	Arg	Thr	Ile	Asn	Leu
			260					265					270		
Pro	Thr	Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Leu	Gly	Lys	Thr
		275					280					285			
Lys	Ser	Lys	Leu	Gly	Ala	Glu	Glu	Ile	Ala	Ala	Ile	Trp	Glu	Thr	Glu
	290					295					300				
Glu	Ser	Met	Lys	Lys	Leu	Ala	Gln	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Ala
305					310					315					320
Thr	Tyr	Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Glu	Leu	Ala
				325					330					335	
Lys	Leu	Ile	Gly	Gln	Ser	Val	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly
			340					345					350		
Asn	Leu	Val	Glu	Trp	Tyr	Leu	Leu	Arg	Val	Ala	Tyr	Ala	Arg	Asn	Glu
		355					360					365			
Leu	Ala	Pro	Asn	Lys	Pro	Asp	Glu	Glu	Glu	Tyr	Lys	Arg	Arg	Leu	Arg
	370					375					380				
Thr	Thr	Tyr	Leu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp
385					390					395					400
Glu	Asn	Ile	Ile	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile
				405					410					415	
Val	Thr	His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Glu	Lys	Glu	Gly	Cys	Lys

420						425						430					
Asn	Tyr	Asp	Val	Ala	Pro	Ile	Val	Gly	Tyr	Arg	Phe	Cys	Lys	Asp	Phe		
		435					440					445					
Pro	Gly	Phe	Ile	Pro	Ser	Ile	Leu	Gly	Asp	Leu	Ile	Ala	Met	Arg	Gln		
	450					455					460						
Asp	Ile	Lys	Lys	Lys	Met	Lys	Ser	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys		
465					470					475					480		
Met	Leu	Asp	Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Tyr		
				485					490					495			
Tyr	Gly	Tyr	Met	Gly	Tyr	Pro	Lys	Ala	Arg	Trp	Tyr	Ser	Lys	Glu	Cys		
			500					505					510				
Ala	Glu	Ser	Val	Thr	Ala	Trp	Gly	Arg	His	Tyr	Ile	Glu	Met	Thr	Ile		
		515					520					525					
Arg	Glu	Ile	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr		
	530					535					540						
Asp	Gly	Phe	Tyr	Ala	Thr	Ile	Pro	Gly	Glu	Lys	Pro	Glu	Leu	Ile	Lys		
545					550					555					560		
Lys	Lys	Ala	Lys	Glu	Phe	Leu	Asn	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly		
				565					570					575			
Leu	Leu	Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Leu	Arg	Gly	Phe	Phe	Val		
			580					585					590				
Thr	Lys	Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Arg	Ile	Thr	Thr		
		595					600					605					
Arg	Gly	Leu	Glu	Val	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu		
	610					615					620						
Thr	Gln	Ala	Lys	Val	Leu	Glu	Ala	Ile	Leu	Lys	Glu	Gly	Ser	Val	Glu		
625					630					635					640		
Lys	Ala	Val	Glu	Val	Val	Arg	Asp	Val	Val	Glu	Lys	Ile	Ala	Lys	Tyr		
				645					650					655			
Arg	Val	Pro	Leu	Glu	Lys	Leu	Val	Ile	His	Glu	Gln	Ile	Thr	Arg	Asp		
			660					665					670				
Leu	Lys	Asp	Tyr	Lys	Ala	Ile	Gly	Pro	His	Val	Ala	Ile	Ala	Lys	Arg		
		675					680					685					
Leu	Ala	Ala	Arg	Gly	Ile	Lys	Val	Lys	Pro	Gly	Thr	Ile	Ile	Ser	Tyr		
	690					695					700						
Ile	Val	Leu	Lys	Gly	Ser	Gly	Lys	Ile	Ser	Asp	Arg	Val	Ile	Leu	Leu		
705					710					715					720		
Thr	Glu	Tyr	Asp	Pro	Arg	Lys	His	Lys	Tyr	Asp	Pro	Asp	Tyr	Tyr	Ile		

	725		730		735
Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly	740		745		750
Tyr Arg Lys Glu Asp Leu Arg Tyr Gln Ser Ser Lys Gln Thr Gly Leu	755		760		765
Asp Ala Trp Leu Lys Arg	770				
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Leu Asp Pro		20	25		30
His Phe Gln Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile		35	40		45
Glu Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Thr Val Arg		50	55		60
Val Leu Asp Ala Val Lys Val Arg Lys Lys Phe Leu Gly Arg Glu Val		65	70		75
Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Glu Pro Ala Met		85	90		95
Arg Gly Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr		100	105		110
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro		115	120		125
Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr		130	135		140
Phe Tyr His Glu Gly Asp Glu Phe Gly Lys Gly Glu Ile Ile Met Ile		145	150		155
Ser Tyr Ala Asp Glu Glu Glu Ala Arg Val Ile Thr Trp Lys Asn Ile		165	170		175
Asp Leu Pro Tyr Val Asp Val Val Ser Asn Glu Arg Glu Met Ile Lys		180	185		190
Arg Phe Val Gln Val Val Lys Glu Lys Asp Pro Asp Val Ile Ile Thr		195	200		205

Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Leu	Pro	Tyr	Leu	Ile	Lys	Arg	Ala	Glu	
210						215					220					
Lys	Leu	Gly	Val	Arg	Leu	Val	Leu	Gly	Arg	Asp	Lys	Glu	His	Pro	Glu	
225					230					235					240	
Pro	Lys	Ile	Gln	Arg	Met	Gly	Asp	Ser	Phe	Ala	Val	Glu	Ile	Lys	Gly	
				245					250					255		
Arg	Ile	His	Phe	Asp	Leu	Phe	Pro	Val	Val	Arg	Arg	Thr	Ile	Asn	Leu	
			260					265					270			
Pro	Thr	Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Leu	Gly	Lys	Thr	
		275					280					285				
Lys	Ser	Lys	Leu	Gly	Ala	Glu	Glu	Ile	Ala	Ala	Ile	Trp	Glu	Thr	Glu	
290						295					300					
Glu	Ser	Met	Lys	Lys	Leu	Ala	Gln	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Ala	
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Thr	Tyr	Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Glu	Leu	Ala	
				325					330					335		
Lys	Leu	Ile	Gly	Gln	Ser	Val	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	
			340					345					350			
Asn	Leu	Val	Glu	Trp	Tyr	Leu	Leu	Arg	Val	Ala	Tyr	Ala	Arg	Asn	Glu	
		355					360					365				
Leu	Ala	Pro	Asn	Lys	Pro	Asp	Glu	Glu	Glu	Tyr	Lys	Arg	Arg	Leu	Arg	
	370					375					380					
Thr	Thr	Tyr	Leu	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	
385					390					395					400	
Glu	Asn	Ile	Ile	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	
				405					410					415		
Val	Thr	His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Glu	Lys	Glu	Gly	Cys	Lys	
			420					425					430			
Asn	Tyr	Asp	Val	Ala	Pro	Ile	Val	Gly	Tyr	Arg	Phe	Cys	Lys	Asp	Phe	
		435					440					445				
Pro	Gly	Phe	Ile	Pro	Ser	Ile	Leu	Gly	Asp	Leu	Ile	Ala	Met	Arg	Gln	
	450					455					460					
Asp	Ile	Lys	Lys	Lys	Met	Lys	Ser	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys	
465					470					475					480	
Met	Leu	Asp	Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Tyr	
				485					490					495		
Tyr	Gly	Tyr	Met	Gly	Tyr	Pro	Lys	Ala	Arg	Trp	Tyr	Ser	Lys	Glu	Cys	
			500					505					510			

Ala Glu Ser Val Thr Ala Trp Gly Arg His Tyr Ile Glu Met Thr Ile
 515 520 525
 Arg Glu Ile Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr
 530 535 540
 Asp Gly Phe Tyr Ala Thr Ile Pro Gly Glu Lys Pro Glu Leu Ile Lys
 545 550 555 560
 Lys Lys Ala Lys Glu Phe Leu Asn Tyr Ile Asn Ser Lys Leu Pro Gly
 565 570 575
 Leu Leu Glu Leu Glu Tyr Glu Gly Phe Tyr Leu Arg Gly Phe Phe Val
 580 585 590
 Thr Lys Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Arg Ile Thr Thr
 595 600 605
 Arg Gly Leu Glu Val Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu
 610 615 620
 Thr Gln Ala Lys Val Leu Glu Ala Ile Leu Lys Glu Gly Ser Val Glu
 625 630 635 640
 Lys Ala Val Glu Val Val Arg Asp Val Val Glu Lys Ile Ala Lys Tyr
 645 650 655
 Arg Val Pro Leu Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp
 660 665 670
 Leu Lys Asp Tyr Lys Ala Ile Gly Pro His Val Ala Ile Ala Lys Arg
 675 680 685
 Leu Ala Ala Arg Gly Ile Lys Val Lys Pro Gly Thr Ile Ile Ser Tyr
 690 695 700
 Ile Val Leu Lys Gly Ser Gly Lys Ile Ser Asp Arg Val Ile Leu Leu
 705 710 715 720
 Thr Glu Tyr Asp Pro Arg Lys His Lys Tyr Asp Pro Asp Tyr Tyr Ile
 725 730 735
 Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly
 740 745 750
 Tyr Arg Lys Glu Asp Leu Arg Tyr Gln Ser Ser Lys Gln Thr Gly Leu
 755 760 765
 Asp Ala Trp Leu Lys Arg
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 <212> PRT
 <213> Pyrococcus GB-D

<400> 55

Met	Ile	Leu	Asp	Val	Asp	Tyr	Ile	Thr	Glu	Asn	Gly	Lys	Pro	Val	Ile	1	5	10	15
Arg	Val	Phe	Lys	Lys	Glu	Asn	Gly	Glu	Phe	Arg	Ile	Glu	Tyr	Asp	Arg	20	25	30	
Glu	Phe	Glu	Pro	Tyr	Phe	Tyr	Ala	Leu	Leu	Arg	Asp	Asp	Ser	Ala	Ile	35	40	45	
Glu	Glu	Ile	Lys	Lys	Ile	Thr	Ala	Glu	Arg	His	Gly	Arg	Val	Val	Lys	50	55	60	
Val	Lys	Arg	Ala	Glu	Lys	Val	Lys	Lys	Lys	Phe	Leu	Gly	Arg	Ser	Val	65	70	75	80
Glu	Val	Trp	Val	Leu	Tyr	Phe	Thr	His	Pro	Gln	Asp	Arg	Pro	Ala	Ile	85	90	95	
Arg	Asp	Lys	Ile	Arg	Lys	His	Pro	Ala	Val	Ile	Asp	Ile	Tyr	Glu	Tyr	100	105	110	
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	115	120	125	
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Leu	Met	Ser	Phe	Asp	Ile	Glu	Thr	130	135	140	
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Thr	Gly	Pro	Ile	Leu	Met	Ile	145	150	155	160
Ser	Tyr	Ala	Asp	Glu	Ser	Glu	Ala	Arg	Val	Ile	Thr	Trp	Lys	Lys	Ile	165	170	175	
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys	180	185	190	
Arg	Phe	Leu	Arg	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr	195	200	205	
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Cys	Glu	210	215	220	
Lys	Leu	Gly	Val	Ser	Phe	Thr	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys	225	230	235	240
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Val	245	250	255	
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr	260	265	270	
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Lys	Pro	Lys	Glu	275	280	285	
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Thr	Ala	Trp	Glu	Thr	Gly	Glu	Gly	290	295	300	

Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Val	Thr	Tyr	
305					310					315					320	
Glu	Leu	Gly	Arg	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	
				325					330					335		
Ile	Gly	Gln	Gly	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	
		355					360					365				
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Gly	Gly	Tyr	
	370					375					380					
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Asp	Asn	Ile	
385					390					395					400	
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His	
				405					410					415		
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Arg	Ser	Tyr	Asp	
			420					425					430			
Val	Ala	Pro	Glu	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe	
		435					440					445				
Ile	Pro	Ser	Leu	Leu	Gly	Asn	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	Lys	
	450					455					460					
Arg	Lys	Met	Lys	Ala	Thr	Leu	Asp	Pro	Leu	Glu	Lys	Asn	Leu	Leu	Asp	
465					470					475					480	
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	Tyr	
				485					490					495		
Tyr	Gly	Tyr	Ala	Arg	Ala	Arg	Trp	Tyr	Cys	Arg	Glu	Cys	Ala	Glu	Ser	
			500					505					510			
Val	Thr	Ala	Trp	Gly	Arg	Glu	Tyr	Ile	Glu	Met	Val	Ile	Arg	Glu	Leu	
		515					520					525				
Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr	Asp	Gly	Leu	
	530					535					540					
His	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala	
545					550					555					560	
Met	Glu	Phe	Leu	Asn	Tyr	Ile	Asn	Pro	Lys	Leu	Pro	Gly	Leu	Leu	Glu	
				565					570					575		
Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Val	Arg	Gly	Phe	Phe	Val	Thr	Lys	Lys	
			580					585					590			
Lys	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Ile	Thr	Thr	Arg	Gly	Leu	
		595					600					605				

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Ile Leu Arg His Gly Asp Val Glu Glu Ala Val
 625 630 635 640
 Arg Ile Val Arg Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Glu Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Ile Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Thr Lys His Lys Tyr Asp Ala Asp Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
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 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
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 Leu Lys Pro Lys Gly Lys Lys Lys
 770 775

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 <212> PRT
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<400> 56

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Asn Gly Lys Pro Val Ile
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 Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Arg Ile Glu Tyr Asp Arg
 20 25 30
 Glu Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Arg Asp Asp Ser Ala Ile
 35 40 45
 Glu Glu Ile Lys Lys Ile Thr Ala Glu Arg His Gly Arg Val Val Lys
 50 55 60
 Val Lys Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Ser Val
 65 70 75 80
 Glu Val Trp Val Leu Tyr Phe Thr His Pro Gln Asp Glu Pro Ala Ile

85							90					95						
Arg	Asp	Lys	Ile	Arg	Lys	His	Pro	Ala	Val	Ile	Asp	Ile	Tyr	Glu	Tyr			
			100					105					110					
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro			
		115					120					125						
Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Leu	Met	Ser	Phe	Asp	Ile	Glu	Thr			
		130				135					140							
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Thr	Gly	Pro	Ile	Leu	Met	Ile			
145					150					155					160			
Ser	Tyr	Ala	Asp	Glu	Ser	Glu	Ala	Arg	Val	Ile	Thr	Trp	Lys	Lys	Ile			
				165					170					175				
Asp	Leu	Pro	Tyr	Val	Glu	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys			
			180					185					190					
Arg	Phe	Leu	Arg	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr			
		195					200					205						
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Cys	Glu			
	210					215					220							
Lys	Leu	Gly	Val	Ser	Phe	Thr	Leu	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys			
225					230					235				240				
Ile	Gln	Arg	Met	Gly	Asp	Arg	Phe	Ala	Val	Glu	Val	Lys	Gly	Arg	Val			
				245					250					255				
His	Phe	Asp	Leu	Tyr	Pro	Val	Ile	Arg	Arg	Thr	Ile	Asn	Leu	Pro	Thr			
			260					265					270					
Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Val	Phe	Gly	Lys	Pro	Lys	Glu			
		275					280					285						
Lys	Val	Tyr	Ala	Glu	Glu	Ile	Ala	Thr	Ala	Trp	Glu	Thr	Gly	Glu	Gly			
	290					295					300							
Leu	Glu	Arg	Val	Ala	Arg	Tyr	Ser	Met	Glu	Asp	Ala	Arg	Val	Thr	Tyr			
305					310					315					320			
Glu	Leu	Gly	Arg	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu			
				325					330					335				
Ile	Gly	Gln	Gly	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu			
			340				345						350					
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala			
		355					360					365						
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Gly	Gly	Tyr			
	370					375					380							
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Asp	Asn	Ile			

385					390					395					400
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His
				405					410					415	
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Arg	Ser	Tyr	Asp
			420					425					430		
Val	Ala	Pro	Glu	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe
		435					440					445			
Ile	Pro	Ser	Leu	Leu	Gly	Asn	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	Lys
	450					455					460				
Arg	Lys	Met	Lys	Ala	Thr	Leu	Asp	Pro	Leu	Glu	Lys	Asn	Leu	Leu	Asp
465					470					475					480
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Tyr	Tyr	Gly	Tyr
				485					490					495	
Tyr	Gly	Tyr	Ala	Arg	Ala	Arg	Trp	Tyr	Cys	Arg	Glu	Cys	Ala	Glu	Ser
			500					505					510		
Val	Thr	Ala	Trp	Gly	Arg	Glu	Tyr	Ile	Glu	Met	Val	Ile	Arg	Glu	Leu
		515					520					525			
Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr	Asp	Gly	Leu
	530					535					540				
His	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala
545					550				555						560
Met	Glu	Phe	Leu	Asn	Tyr	Ile	Asn	Pro	Lys	Leu	Pro	Gly	Leu	Leu	Glu
				565				570					575		
Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Val	Arg	Gly	Phe	Phe	Val	Thr	Lys	Lys
			580					585					590		
Lys	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Ile	Thr	Thr	Arg	Gly	Leu
		595					600					605			
Glu	Ile	Val	Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	Ala
	610					615					620				
Arg	Val	Leu	Glu	Ala	Ile	Leu	Arg	His	Gly	Asp	Val	Glu	Glu	Ala	Val
625					630				635						640
Arg	Ile	Val	Arg	Glu	Val	Thr	Glu	Lys	Leu	Ser	Lys	Tyr	Glu	Val	Pro
				645					650					655	
Pro	Glu	Lys	Leu	Val	Ile	His	Glu	Gln	Ile	Thr	Arg	Glu	Leu	Lys	Asp
			660					665					670		
Tyr	Lys	Ala	Thr	Gly	Pro	His	Val	Ala	Ile	Ala	Lys	Arg	Leu	Ala	Ala
		675					680					685			
Arg	Gly	Val	Lys	Ile	Arg	Pro	Gly	Thr	Val	Ile	Ser	Tyr	Ile	Val	Leu

690		695		700
Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe				
705		710		715
Asp Pro Thr Lys His Lys Tyr Asp Ala Asp Tyr Tyr Ile Glu Asn Gln				
	725		730	735
Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys				
	740		745	750
Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp				
	755		760	765
Leu Lys Pro Lys Gly Lys Lys Lys				
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agg atc ttc aag aag gag aac ggc gag ttc aaa ata gac tac gac aga	96
Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg	
20 25 30	
aac ttt gag cca tac atc tac gcg ctc ttg aag gac gac tct gcg att	144
Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile	
35 40 45	
gag gac gtc aag aag ata act gcc gag agg cac ggc act acc gtt agg	192
Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg	
50 55 60	
gtt gtc agg gcc gag aaa gtg aag aag aag ttc cta ggc agg ccg ata	240
Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile	
65 70 75 80	
gag gtc tgg aag ctc tac ttc act cac ccc cag gac nnn ccc gca atc	288
Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile	
85 90 95	

agg gac aag ata aag gag cat cct gcc gtt gtg gac atc tac gag tac	336
Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr	
100 105 110	
gac atc ccc ttc gcg aag cgc tac ctc ata gac aaa ggc tta atc ccg	384
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro	
115 120 125	
atg gag ggc gac gag gaa ctt aag atg ctc gcc ttc gac atc gag acg	432
Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr	
130 135 140	
ctc tat cac gag ggc gag gag ttc gcc gaa ggg cct atc ctg atg ata	480
Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile	
145 150 155 160	
agc tac gcc gac gag gaa ggg gcg cgc gtt att acc tgg aag aat atc	528
Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile	
165 170 175	
gac ctt ccc tat gtc gac gtc gtt tcc acc gag aag gag atg ata aag	576
Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys	
180 185 190	
cgc ttc ctc aag gtc gtc aag gaa aag gat ccc gac gtc ctc ata acc	624
Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr	
195 200 205	
tac aac ggc gac aac ttc gac ttc gcc tac ctc aag aag cgc tcc gag	672
Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu	
210 215 220	
aag ctc gga gtc aag ttc atc ctc gga agg gaa ggg agc gag ccg aaa	720
Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys	
225 230 235 240	
atc cag cgc atg ggc gat cgc ttt gcg gtg gag gtc aag gga agg att	768
Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile	
245 250 255	
cac ttc gac ctc tac ccc gtc att agg aga acg att aac ctc ccc act	816
His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr	
260 265 270	
tac acc ctt gag gca gta tat gaa gcc atc ttt gga cag ccg aag gag	864
Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu	
275 280 285	
aag gtc tac gct gag gag ata gcg cag gcc tgg gaa acg ggc gag gga	912
Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly	
290 295 300	
tta gaa agg gtg gcc cgc tac tcg atg gag gac gca aag gta acc tat	960
Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr	
305 310 315 320	
gaa ctc gga aaa gag ttc ttc cct atg gaa gcc cag ctc tcg cgc ctc	1008

Glu	Leu	Gly	Lys	Glu	Phe	Phe	Pro	Met	Glu	Ala	Gln	Leu	Ser	Arg	Leu	
				325					330					335		
gta	ggc	cag	agc	ctc	tgg	gat	gta	tct	cgc	tcg	agt	acc	gga	aac	ctc	1056
Val	Gly	Gln	Ser	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
			340					345					350			
gtc	gag	tgg	ttt	ttg	ctg	agg	aag	gcc	tac	gag	agg	aat	gaa	ctt	gca	1104
Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Leu	Ala	
		355					360					365				
cca	aac	aag	ccg	gac	gag	agg	gag	ctg	gca	aga	aga	agg	gag	agc	tac	1152
Pro	Asn	Lys	Pro	Asp	Glu	Arg	Glu	Leu	Ala	Arg	Arg	Arg	Glu	Ser	Tyr	
	370					375					380					
gcg	ggt	gga	tac	gtc	aag	gag	ccc	gaa	agg	gga	ctg	tgg	gag	aac	atc	1200
Ala	Gly	Gly	Tyr	Val	Lys	Glu	Pro	Glu	Arg	Gly	Leu	Trp	Glu	Asn	Ile	
385					390				395						400	
gtg	tat	ctg	gac	ttc	cgc	tcc	ctg	tat	cct	tcg	ata	ata	atc	acc	cat	1248
Val	Tyr	Leu	Asp	Phe	Arg	Ser	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	His	
				405					410					415		
aac	gtc	tcc	cct	gat	aca	ctc	aac	agg	gag	ggt	tgt	gag	gag	tac	gac	1296
Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Arg	Glu	Gly	Cys	Glu	Glu	Tyr	Asp	
			420					425					430			
gtg	gct	cct	cag	gta	ggc	cat	aag	ttc	tgc	aag	gac	ttc	ccc	ggc	ttc	1344
Val	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Phe	Pro	Gly	Phe	
		435					440					445				
atc	cca	agc	ctc	ctc	gga	gac	ctc	ttg	gag	gag	aga	cag	aag	gta	aag	1392
Ile	Pro	Ser	Leu	Leu	Gly	Asp	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Val	Lys	
	450					455					460					
aag	aag	atg	aag	gcc	act	ata	gac	cca	atc	gag	aag	aaa	ctc	ctc	gat	1440
Lys	Lys	Met	Lys	Ala	Thr	Ile	Asp	Pro	Ile	Glu	Lys	Lys	Leu	Leu	Asp	
465					470				475						480	
tac	agg	caa	cga	gca	atc	aaa	atc	ctt	gct	aat	agc	ttc	tac	ggt	tac	1488
Tyr	Arg	Gln	Arg	Ala	Ile	Lys	Ile	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	Tyr	
				485					490					495		
tac	ggc	tat	gca	aag	gcc	cgc	tgg	tac	tgc	aag	gag	tgc	gcc	gag	agc	1536
Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	Ser	
			500					505					510			
gtt	acc	gct	tgg	ggc	agg	cag	tac	atc	gag	acc	acg	ata	agg	gaa	ata	1584
Val	Thr	Ala	Trp	Gly	Arg	Gln	Tyr	Ile	Glu	Thr	Thr	Ile	Arg	Glu	Ile	
		515					520					525				
gag	gag	aaa	ttt	ggc	ttt	aaa	gtc	ctc	tac	gcg	gac	aca	gat	gga	ttt	1632
Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ala	Asp	Thr	Asp	Gly	Phe	
	530					535					540					
ttc	gca	aca	ata	cct	gga	gcg	gac	gcc	gaa	acc	gtc	aaa	aag	aag	gca	1680
Phe	Ala	Thr	Ile	Pro	Gly	Ala	Asp	Ala	Glu	Thr	Val	Lys	Lys	Lys	Ala	

545	550	555	560	
aag gag ttc ctg gac tac atc aac gcc aaa ctg ccc ggc ctg ctc gaa				1728
Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu	565	570	575	
ctc gaa tac gag ggc ttc tac aag cgc ggc ttc ttc gtg acg aag aag				1776
Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys	580	585	590	
aag tac gcg gtt ata gac gag gag gac aag ata acg acg cgc ggg ctt				1824
Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu	595	600	605	
gaa ata gtt agg cgt gac tgg agc gag ata gcg aag gag acg cag gcg				1872
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala	610	615	620	
agg gtt ctt gag gcg ata cta aag cac ggt gac gtt gaa gaa gcg gta				1920
Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val	625	630	635	640
agg att gtc aaa gag gtt acg gag aag ctg agc aag tac gag gtt cca				1968
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro	645	650	655	
ccg gag aag ctg gtc atc tac gag cag ata acc cgc gac ctg aag gac				2016
Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp	660	665	670	
tac aag gcc acc ggg ccg cat gtg gct gtt gca aaa cgc ctc gcc gca				2064
Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala	675	680	685	
agg ggg ata aaa atc cgg ccc gga acg gtc ata agc tac atc gtg ctc				2112
Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu	690	695	700	
aaa ggc tcg gga agg att ggg gac agg gct ata ccc ttt gac gaa ttt				2160
Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe	705	710	715	720
gac ccg gca aag cac aag tac gat gca gaa tac tac atc gag aac cag				2208
Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln	725	730	735	
gtt ctt cca gct gtg gag agg att ctg agg gcc ttt ggt tac cgt aaa				2256
Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys	740	745	750	
gaa gat tta agg tat cag aaa acg cgg cag gtt ggc ttg ggg gcg tgg				2304
Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp	755	760	765	
cta aaa cct aag aca tga				2322
Leu Lys Pro Lys Thr	770			

<210> 58
 <211> 773
 <212> PRT
 <213> Thermococcus gorgonarius

 <220>
 <221> misc_feature
 <222> (93)..(93)
 <223> The 'Xaa' at location 93 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

 <400> 58

 Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
 1 5 10 15
 Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
 20 25 30
 Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
 35 40 45
 Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
 50 55 60
 Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
 65 70 75 80
 Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile
 85 90 95
 Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
 100 105 110
 Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
 115 120 125
 Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
 130 135 140
 Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
 145 150 155 160
 Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
 165 170 175
 Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
 180 185 190
 Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
 195 200 205
 Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
 210 215 220

Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
 225 230 235 240
 Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
 245 250 255
 His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
 260 265 270
 Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
 275 280 285
 Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
 290 295 300
 Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
 305 310 315 320
 Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
 325 330 335
 Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
 340 345 350
 Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
 355 360 365
 Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
 370 375 380
 Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
 385 390 395 400
 Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
 405 410 415
 Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
 420 425 430
 Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
 435 440 445
 Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
 450 455 460
 Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
 465 470 475 480
 Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
 485 490 495
 Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
 500 505 510
 Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
 515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
 530 535 540
 Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
 545 550 555 560
 Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
 565 570 575
 Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
 580 585 590
 Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
 595 600 605
 Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
 610 615 620
 Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
 625 630 635 640
 Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
 645 650 655
 Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
 660 665 670
 Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
 675 680 685
 Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
 690 695 700
 Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
 705 710 715 720
 Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
 725 730 735
 Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
 740 745 750
 Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
 755 760 765
 Leu Lys Pro Lys Thr
 770

<210> 59
 <211> 2322
 <212> DNA
 <213> Thermococcus gorgonarius

<220>
 <221> CDS
 <222> (1) .. (2322)
 <223>

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<220>
<221> misc_feature
<222> (277)..(279)
<223> NNN = GAA, GAG

<400> 59
atg atc ctc gat aca gac tac ata act gag gat gga aag ccc gtc atc      48
Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1          5          10          15

agg atc ttc aag aag gag aac ggc gag ttc aaa ata gac tac gac aga      96
Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
          20          25          30

aac ttt gag cca tac atc tac gcg ctc ttg aag gac gac tct gcg att      144
Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
          35          40          45

gag gac gtc aag aag ata act gcc gag agg cac ggc act acc gtt agg      192
Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
          50          55          60

gtt gtc agg gcc gag aaa gtg aag aag aag ttc cta ggc agg ccg ata      240
Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65          70          75          80

gag gtc tgg aag ctc tac ttc act cac ccc cag gac nnn ccc gca atc      288
Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile
          85          90          95

agg gac aag ata aag gag cat cct gcc gtt gtg gac atc tac gag tac      336
Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
          100          105          110

gac atc ccc ttc gcg aag cgc tac ctc ata gac aaa ggc tta atc ccg      384
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
          115          120          125

atg gag ggc gac gag gaa ctt aag atg ctc gcc ttc gac atc gag acg      432
Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
          130          135          140

ctc tat cac gag ggc gag gag ttc gcc gaa ggg cct atc ctg atg ata      480
Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145          150          155          160

agc tac gcc gac gag gaa ggg gcg cgc gtt att acc tgg aag aat atc      528
Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
          165          170          175

gac ctt ccc tat gtc gac gtc gtt tcc acc gag aag gag atg ata aag      576
Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
          180          185          190

cgc ttc ctc aag gtc gtc aag gaa aag gat ccc gac gtc ctc ata acc      624
Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr

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195	200	205	
tac aac ggc gac aac ttc gac ttc gcc tac ctc aag aag cgc tcc gag Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu 210 215 220			672
aag ctc gga gtc aag ttc atc ctc gga agg gaa ggg agc gag ccg aaa Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys 225 230 235 240			720
atc cag cgc atg ggc gat cgc ttt gcg gtg gag gtc aag gga agg att Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile 245 250 255			768
cac ttc gac ctc tac ccc gtc att agg aga acg att aac ctc ccc act His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr 260 265 270			816
tac acc ctt gag gca gta tat gaa gcc atc ttt gga cag ccg aag gag Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu 275 280 285			864
aag gtc tac gct gag gag ata gcg cag gcc tgg gaa acg ggc gag gga Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly 290 295 300			912
tta gaa agg gtg gcc cgc tac tcg atg gag gac gca aag gta acc tat Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr 305 310 315 320			960
gaa ctc gga aaa gag ttc ttc cct atg gaa gcc cag ctc tcg cgc ctc Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu 325 330 335			1008
gta ggc cag agc ctc tgg gat gta tct cgc tcg agt acc gga aac ctc Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu 340 345 350			1056
gtc gag tgg ttt ttg ctg agg aag gcc tac gag agg aat gaa ctt gca Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala 355 360 365			1104
cca aac aag ccg gac gag agg gag ctg gca aga aga agg gag agc tac Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr 370 375 380			1152
gcg ggt gga tac gtc aag gag ccc gaa agg gga ctg tgg gag aac atc Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile 385 390 395 400			1200
gtg tat ctg gac ttc cgc tcc ctg tat cct tcg ata ata atc acc cat Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His 405 410 415			1248
aac gtc tcc cct gat aca ctc aac agg gag ggt tgt gag gag tac gac Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp 420 425 430			1296

gtg gct cct cag gta ggc cat aag ttc tgc aag gac ttc ccc ggc ttc	1344
Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe	
435 440 445	
atc cca agc ctc ctc gga gac ctc ttg gag gag aga cag aag gta aag	1392
Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys	
450 455 460	
aag aag atg aag gcc act ata gac cca atc gag aag aaa ctc ctc gat	1440
Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp	
465 470 475 480	
tac agg caa cga gca atc aaa atc ctt gct aat agc ttc tac ggt tac	1488
Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr	
485 490 495	
tac ggc tat gca aag gcc cgc tgg tac tgc aag gag tgc gcc gag agc	1536
Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser	
500 505 510	
gtt acc gct tgg ggc agg cag tac atc gag acc acg ata agg gaa ata	1584
Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile	
515 520 525	
gag gag aaa ttt ggc ttt aaa gtc ctc tac gcg gac aca gat gga ttt	1632
Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe	
530 535 540	
ttc gca aca ata cct gga gcg gac gcc gaa acc gtc aaa aag aag gca	1680
Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala	
545 550 555 560	
aag gag ttc ctg gac tac atc aac gcc aaa ctg ccc ggc ctg ctc gaa	1728
Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu	
565 570 575	
ctc gaa tac gag ggc ttc tac aag cgc ggc ttc ttc gtg acg aag aag	1776
Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys	
580 585 590	
aag tac gcg gtt ata gac gag gag gac aag ata acg acg cgc ggg ctt	1824
Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu	
595 600 605	
gaa ata gtt agg cgt gac tgg agc gag ata gcg aag gag acg cag gcg	1872
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala	
610 615 620	
agg gtt ctt gag gcg ata cta aag cac ggt gac gtt gaa gaa gcg gta	1920
Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val	
625 630 635 640	
agg att gtc aaa gag gtt acg gag aag ctg agc aag tac gag gtt cca	1968
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro	
645 650 655	

ccg gag aag ctg gtc atc tac gag cag ata acc cgc gac ctg aag gac Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp 660 665 670	2016
tac aag gcc acc ggg ccg cat gtg gct gtt gca aaa cgc ctc gcc gca Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala 675 680 685	2064
agg ggg ata aaa atc cgg ccc gga acg gtc ata agc tac atc gtg ctc Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu 690 695 700	2112
aaa ggc tcg gga agg att ggg gac agg gct ata ccc ttt gac gaa ttt Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe 705 710 715 720	2160
gac ccg gca aag cac aag tac gat gca gaa tac tac atc gag aac cag Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln 725 730 735	2208
gtt ctt cca gct gtg gag agg att ctg agg gcc ttt ggt tac cgt aaa Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys 740 745 750	2256
gaa gat tta agg tat cag aaa acg cgg cag gtt ggc ttg ggg gcg tgg Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp 755 760 765	2304
cta aaa cct aag aca tga Leu Lys Pro Lys Thr 770	2322

<210> 60
 <211> 773
 <212> PRT
 <213> Thermococcus gorgonarius

<220>
 <221> misc_feature
 <222> (93)..(93)
 <223> The 'Xaa' at location 93 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<400> 60

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile 1 5 10 15
Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg 20 25 30
Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile 35 40 45
Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg 50 55 60

Val	Val	Arg	Ala	Glu	Lys	Val	Lys	Lys	Lys	Phe	Leu	Gly	Arg	Pro	Ile	
65					70					75					80	
Glu	Val	Trp	Lys	Leu	Tyr	Phe	Thr	His	Pro	Gln	Asp	Xaa	Pro	Ala	Ile	
				85					90					95		
Arg	Asp	Lys	Ile	Lys	Glu	His	Pro	Ala	Val	Val	Asp	Ile	Tyr	Glu	Tyr	
			100					105					110			
Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro	
		115					120					125				
Met	Glu	Gly	Asp	Glu	Glu	Leu	Lys	Met	Leu	Ala	Phe	Asp	Ile	Glu	Thr	
	130					135						140				
Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Ala	Glu	Gly	Pro	Ile	Leu	Met	Ile	
145					150					155					160	
Ser	Tyr	Ala	Asp	Glu	Glu	Gly	Ala	Arg	Val	Ile	Thr	Trp	Lys	Asn	Ile	
				165					170					175		
Asp	Leu	Pro	Tyr	Val	Asp	Val	Val	Ser	Thr	Glu	Lys	Glu	Met	Ile	Lys	
			180					185					190			
Arg	Phe	Leu	Lys	Val	Val	Lys	Glu	Lys	Asp	Pro	Asp	Val	Leu	Ile	Thr	
		195					200					205				
Tyr	Asn	Gly	Asp	Asn	Phe	Asp	Phe	Ala	Tyr	Leu	Lys	Lys	Arg	Ser	Glu	
	210					215					220					
Lys	Leu	Gly	Val	Lys	Phe	Ile	Leu	Gly	Arg	Glu	Gly	Ser	Glu	Pro	Lys	
225					230					235					240	
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Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile Arg Leu Phe Lys	
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Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg Thr Phe Arg Pro	
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Arg	Arg	Asp	Trp	Ser	Glu	Ile	Ala	Lys	Glu	Thr	Gln	Ala	Arg	Val	Leu	
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Arg	Phe	Leu	Arg	Ile	Ile	Arg	Glu	Lys	Asp	Pro	Asp	Ile	Ile	Val	Thr		
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Tyr	Asn	Gly	Asp	Ser	Phe	Asp	Phe	Pro	Tyr	Leu	Ala	Lys	Arg	Ala	Glu		
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Lys	Leu	Gly	Ile	Lys	Leu	Thr	Ile	Gly	Arg	Asp	Gly	Ser	Glu	Pro	Lys		
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Met	Gln	Arg	Ile	Gly	Asp	Met	Thr	Ala	Val	Glu	Val	Lys	Gly	Arg	Ile		
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His	Phe	Asp	Leu	Tyr	His	Val	Ile	Thr	Arg	Thr	Ile	Asn	Leu	Pro	Thr		
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Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu		
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Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn		
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Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr		
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Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu	
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Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu	
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Val	Glu	Trp	Phe	Leu	Leu	Arg	Lys	Ala	Tyr	Glu	Arg	Asn	Glu	Val	Ala	
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Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser	
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Tyr	Thr	Gly	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn	
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Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr	
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His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr	
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Asp	Ile	Ala	Pro	Gln	Val	Gly	His	Lys	Phe	Cys	Lys	Asp	Ile	Pro	Gly	
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Phe	Ile	Pro	Ser	Leu	Leu	Gly	His	Leu	Leu	Glu	Glu	Arg	Gln	Lys	Ile	
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Lys	Thr	Lys	Met	Lys	Glu	Thr	Gln	Asp	Pro	Ile	Glu	Lys	Ile	Leu	Leu	
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Asp	Tyr	Arg	Gln	Lys	Ala	Ile	Lys	Leu	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	
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Tyr	Tyr	Gly	Tyr	Ala	Lys	Ala	Arg	Trp	Tyr	Cys	Lys	Glu	Cys	Ala	Glu	
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Ser	Val	Thr	Ala	Trp	Gly	Arg	Lys	Tyr	Ile	Glu	Leu	Val	Trp	Lys	Glu	
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Leu	Glu	Glu	Lys	Phe	Gly	Phe	Lys	Val	Leu	Tyr	Ile	Asp	Thr	Asp	Gly	
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Leu	Tyr	Ala	Thr	Ile	Pro	Gly	Gly	Glu	Ser	Glu	Glu	Ile	Lys	Lys	Lys	
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Ala	Leu	Glu	Phe	Val	Lys	Tyr	Ile	Asn	Ser	Lys	Leu	Pro	Gly	Leu	Leu	
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Glu	Leu	Glu	Tyr	Glu	Gly	Phe	Tyr	Lys	Arg	Gly	Phe	Phe	Val	Thr	Lys	
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Lys	Arg	Tyr	Ala	Val	Ile	Asp	Glu	Glu	Gly	Lys	Val	Ile	Thr	Arg	Gly	
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Ala	Arg	Val	Leu	Glu	Thr	Ile	Leu	Lys	His	Gly	Asp	Val	Glu	Glu	Ala	
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Val	Arg	Ile	Val	Lys	Glu	Val	Ile	Gln	Lys	Leu	Ala	Asn	Tyr	Glu	Ile	
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Glu	Tyr	Lys	Ala	Ile	Gly	Pro	His	Val	Ala	Val	Ala	Lys	Lys	Leu	Ala	
		675					680					685				
Ala	Lys	Gly	Val	Lys	Ile	Lys	Pro	Gly	Met	Val	Ile	Gly	Tyr	Ile	Val	
	690					695					700					
Leu	Arg	Gly	Asp	Gly	Pro	Ile	Ser	Asn	Arg	Ala	Ile	Leu	Ala	Glu	Glu	
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Tyr	Asp	Pro	Lys	Lys	His	Lys	Tyr	Asp	Ala	Glu	Tyr	Tyr	Ile	Glu	Asn	
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Gln	Val	Leu	Pro	Ala	Val	Leu	Arg	Ile	Leu	Glu	Gly	Phe	Gly	Tyr	Arg	
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Lys	Glu	Asp	Leu	Arg	Tyr	Gln	Lys	Thr	Arg	Gln	Val	Gly	Leu	Thr	Ser	
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Met	Met	Gly	Glu	Leu	Pro	Ile	Ala	Pro	Val	Asp	Arg	Leu	Ile	Arg	Lys		
1				5					10					15			
gct	ggt	gct	cag	aga	gtt	agc	gag	caa	gca	gct	aag	gta	ctt	gca	gag		96
Ala	Gly	Ala	Gln	Arg	Val	Ser	Glu	Gln	Ala	Ala	Lys	Val	Leu	Ala	Glu		
			20					25					30				
cac	ctt	gag	gaa	aaa	gct	att	gag	atc	gca	aaa	aag	gca	gta	gat	ctt		144
His	Leu	Glu	Glu	Lys	Ala	Ile	Glu	Ile	Ala	Lys	Lys	Ala	Val	Asp	Leu		
			35				40					45					
gca	aag	cac	gca	ggt	aga	aag	acc	gtt	aag	gtc	gaa	gac	att	aag	ctc		192
Ala	Lys	His	Ala	Gly	Arg	Lys	Thr	Val	Lys	Val	Glu	Asp	Ile	Lys	Leu		
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Ala Ile Lys Ser
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20 25 30

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35 40 45

Ala Lys His Ala Gly Arg Lys Thr Val Lys Val Glu Asp Ile Lys Leu
50 55 60

Ala Ile Lys Ser
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Arg Val Leu Leu Val Asp Gly His His Leu Ala Tyr Arg Thr Phe His
20 25 30

gcc ctg aag ggc ctc acc acc agc cgg ggg gag ccg gtg cag gcg gtc
Ala Leu Lys Gly Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val
35 40 45

tac ggc ttc gcc aag agc ctc ctc aag gcc ctc aag gag gac ggg gac
Tyr Gly Phe Ala Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Asp
50 55 60

gcg gtg atc gtg gtc ttt gac gcc aag gcc ccc tcc ttc cgc cac gag
Ala Val Ile Val Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu
65 70 75 80

207

48

96

144

192

240

gcc tac ggg ggg tac aag gcg ggc cgg gcc ccc acg cca gag gac ttt Ala Tyr Gly Gly Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe 85 90 95	288
ccc cgg caa ctc gcc ctc atc aag gag ctg gtg gac ctc ctg ggg ctg Pro Arg Gln Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu 100 105 110	336
gcg cgc ctc gag gtc ccg ggc tac gag gcg gac gac gtc ctg gcc agc Ala Arg Leu Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser 115 120 125	384
ctg gcc aag aag gcg gaa aag gag ggc tac gag gtc cgc atc ctc acc Leu Ala Lys Lys Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr 130 135 140	432
gcc gac aaa gac ctt tac cag ctc ctt tcc gac cgc atc cac gtc ctc Ala Asp Lys Asp Leu Tyr Gln Leu Leu Ser Asp Arg Ile His Val Leu 145 150 155 160	480
cac ccc gag ggg tac ctc atc acc ccg gcc tgg ctt tgg gaa aag tac His Pro Glu Gly Tyr Leu Ile Thr Pro Ala Trp Leu Trp Glu Lys Tyr 165 170 175	528
ggc ctg agg ccc gac cag tgg gcc gac tac cgg gcc ctg acc ggg gac Gly Leu Arg Pro Asp Gln Trp Ala Asp Tyr Arg Ala Leu Thr Gly Asp 180 185 190	576
gag tcc gac aac ctt ccc ggg gtc aag ggc atc ggg gag aag acg gcg Glu Ser Asp Asn Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala 195 200 205	624
agg aag ctt ctg gag gag tgg ggg agc ctg gaa gcc ctc ctc aag aac Arg Lys Leu Leu Glu Glu Trp Gly Ser Leu Glu Ala Leu Leu Lys Asn 210 215 220	672
ctg gac cgg ctg aag ccc gcc atc cgg gag aag atc ctg gcc cac atg Leu Asp Arg Leu Lys Pro Ala Ile Arg Glu Lys Ile Leu Ala His Met 225 230 235 240	720
gac gat ctg aag ctc tcc tgg gac ctg gcc aag gtg cgc acc gac ctg Asp Asp Leu Lys Leu Ser Trp Asp Leu Ala Lys Val Arg Thr Asp Leu 245 250 255	768
ccc ctg gag gtg gac ttc gcc aaa agg cgg gag ccc gac cgg gag agg Pro Leu Glu Val Asp Phe Ala Lys Arg Arg Glu Pro Asp Arg Glu Arg 260 265 270	816
ctt agg gcc ttt ctg gag agg ctt gag ttt ggc agc ctc ctc cac gag Leu Arg Ala Phe Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu 275 280 285	864
ttc ggc ctt ctg gaa agc ccc aag gcc ctg gag gag gcc ccc tgg ccc Phe Gly Leu Leu Glu Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro 290 295 300	912

ccg ccg gaa ggg gcc ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro 305 310 315 320	960
atg tgg gcc gat ctt ctg gcc ctg gcc gcc agg ggg ggc cgg gtc Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Arg Gly Gly Arg Val 325 330 335	1008
cac cgg gcc ccc gag cct tat aaa gcc ctc agg gac ctg aag gag gcg His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala 340 345 350	1056
cgg ggg ctt ctc gcc aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly 355 360 365	1104
ctt ggc ctc ccg ccc ggc gac gac ccc atg ctc ctc gcc tac ctc ctg Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu 370 375 380	1152
gac cct tcc aac acc acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg Asp Pro Ser Asn Thr Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly 385 390 395 400	1200
gag tgg acg gag gag gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc Glu Trp Thr Glu Glu Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu 405 410 415	1248
ttc gcc aac ctg tgg ggg agg ctt gag ggg gag gag agg ctc ctt tgg Phe Ala Asn Leu Trp Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp 420 425 430	1296
ctt tac cgg gag gtg gag agg ccc ctt tcc gct gtc ctg gcc cac atg Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala Val Leu Ala His Met 435 440 445	1344
gag gcc acg ggg gtg cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser 450 455 460	1392
ctg gag gtg gcc gag gag atc gcc cgc ctc gag gcc gag gtc ttc cgc Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg 465 470 475 480	1440
ctg gcc ggc cac ccc ttc aac ctc aac tcc cgg gac cag ctg gaa agg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg 485 490 495	1488
gtc ctc ttt gac gag cta ggg ctt ccc gcc atc ggc aag acg gag aag Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys 500 505 510	1536
acc ggc aag cgc tcc acc agc gcc gcc gtc ctg gag gcc ctc cgc gag Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu 515 520 525	1584
gcc cac ccc atc gtg gag aag atc ctg cag tac cgg gag ctc acc aag	1632

Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	
530						535					540					
ctg	aag	agc	acc	tac	att	gac	ccc	ttg	ccg	gac	ctc	atc	cac	ccc	agg	1680
Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	
545					550					555					560	
acg	ggc	cgc	ctc	cac	acc	cgc	ttc	aac	cag	acg	gcc	acg	gcc	acg	ggc	1728
Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
				565					570					575		
agg	cta	agt	agc	tcc	gat	ccc	aac	ctc	cag	aac	atc	ccc	gtc	cgc	acc	1776
Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
			580					585					590			
ccg	ctt	ggg	cag	agg	atc	cgc	cgg	gcc	ttc	atc	gcc	gag	gag	ggg	tgg	1824
Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	
		595					600					605				
cta	ttg	gtg	gcc	ctg	gac	tat	agc	cag	ata	gag	ctc	agg	gtg	ctg	gcc	1872
Leu	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
	610					615					620					
cac	ctc	tcc	ggc	gac	gag	aac	ctg	atc	cgg	gtc	ttc	cag	gag	ggg	cgg	1920
His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	
625					630					635					640	
gac	atc	cac	acg	gag	acc	gcc	agc	tgg	atg	ttc	ggc	gtc	ccc	cgg	gag	1968
Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Arg	Glu	
				645				650						655		
gcc	gtg	gac	ccc	ctg	atg	cgc	cgg	gcg	gcc	aag	acc	atc	aac	ttc	ggg	2016
Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	
			660					665					670			
gtc	ctc	tac	ggc	atg	tgc	gcc	cac	cgc	ctc	tcc	cag	gag	cta	gcc	atc	2064
Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	
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cct	tac	gag	gag	gcc	cag	gcc	ttc	att	gag	cgc	tac	ttt	cag	agc	ttc	2112
Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	
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ccc	aag	gtg	cgg	gcc	tgg	att	gag	aag	acc	ctg	gag	gag	ggc	agg	agg	2160
Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	
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cgg	ggg	tac	gtg	gag	acc	ctc	ttc	ggc	cgc	cgc	cgc	tac	gtg	cca	gac	2208
Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	
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cta	gag	gcc	cgg	gtg	aag	agc	gtg	cgg	gag	gcg	gcc	gag	cgc	atg	gcc	2256
Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	
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ttc	aac	atg	ccc	gtc	cag	ggc	acc	gcc	gcc	gac	ctc	atg	aag	ctg	gct	2304
Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	

755	760	765	
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ctt cag gtc cac gac gag ctg gtc ctc gag gcc cca aaa gag agg gcg Leu Gln Val His Asp Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala 785 790 795 800			2400
gag gcc gtg gcc cgg ctg gcc aag gag gtc atg gag ggg gtg tat ccc Glu Ala Val Ala Arg Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro 805 810 815			2448
ctg gcc gtg ccc ctg gag gtg gag gtg ggg ata ggg gag gac tgg ctc Leu Ala Val Pro Leu Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu 820 825 830			2496
tcc gcc aag gag ggc att gat ggc cgc ggc gga ggc ggg cat cat cat Ser Ala Lys Glu Gly Ile Asp Gly Arg Gly Gly Gly Gly His His His 835 840 845			2544
cat cat cat taa His His His 850			2556
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Ala Tyr Gly Gly Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe 85 90 95			
Pro Arg Gln Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu 100 105 110			
Ala Arg Leu Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser 115 120 125			

Leu	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu	Val	Arg	Ile	Leu	Thr	130	135	140	
Ala	Asp	Lys	Asp	Leu	Tyr	Gln	Leu	Leu	Ser	Asp	Arg	Ile	His	Val	Leu	145	150	155	160
His	Pro	Glu	Gly	Tyr	Leu	Ile	Thr	Pro	Ala	Trp	Leu	Trp	Glu	Lys	Tyr	165	170	175	
Gly	Leu	Arg	Pro	Asp	Gln	Trp	Ala	Asp	Tyr	Arg	Ala	Leu	Thr	Gly	Asp	180	185	190	
Glu	Ser	Asp	Asn	Leu	Pro	Gly	Val	Lys	Gly	Ile	Gly	Glu	Lys	Thr	Ala	195	200	205	
Arg	Lys	Leu	Leu	Glu	Glu	Trp	Gly	Ser	Leu	Glu	Ala	Leu	Leu	Lys	Asn	210	215	220	
Leu	Asp	Arg	Leu	Lys	Pro	Ala	Ile	Arg	Glu	Lys	Ile	Leu	Ala	His	Met	225	230	235	240
Asp	Asp	Leu	Lys	Leu	Ser	Trp	Asp	Leu	Ala	Lys	Val	Arg	Thr	Asp	Leu	245	250	255	
Pro	Leu	Glu	Val	Asp	Phe	Ala	Lys	Arg	Arg	Glu	Pro	Asp	Arg	Glu	Arg	260	265	270	
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Met	Trp	Ala	Asp	Leu	Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	325	330	335	
His	Arg	Ala	Pro	Glu	Pro	Tyr	Lys	Ala	Leu	Arg	Asp	Leu	Lys	Glu	Ala	340	345	350	
Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ser	Val	Leu	Ala	Leu	Arg	Glu	Gly	355	360	365	
Leu	Gly	Leu	Pro	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	370	375	380	
Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	385	390	395	400
Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	405	410	415	
Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	420	425	430	

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 Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser
 450 455 460
 Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg
 465 470 475 480
 Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg
 485 490 495
 Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys
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 Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu
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 Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys
 530 535 540
 Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg
 545 550 555 560
 Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly
 565 570 575
 Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr
 580 585 590
 Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp
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 His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg
 625 630 635 640
 Asp Ile His Thr Glu Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu
 645 650 655
 Ala Val Asp Pro Leu Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly
 660 665 670
 Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile
 675 680 685
 Pro Tyr Glu Glu Ala Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe
 690 695 700
 Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg
 705 710 715 720
 Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp

725								730				735			
Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala
			740						745				750		
Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala
		755					760					765			
Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Glu	Glu	Met	Gly	Ala	Arg	Met	Leu
		770				775					780				
Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu	Glu	Ala	Pro	Lys	Glu	Arg	Ala
785					790					795					800
Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu	Val	Met	Glu	Gly	Val	Tyr	Pro
				805					810					815	
Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Ile	Gly	Glu	Asp	Trp	Leu
			820				825						830		
Ser	Ala	Lys	Glu	Gly	Ile	Asp	Gly	Arg	Gly	Gly	Gly	Gly	His	His	His
		835					840					845			
His	His	His													
		850													

<210> 67
 <211> 750
 <212> DNA
 <213> Pyrococcus furiosus

<220>
 <221> CDS
 <222> (1)..(750)
 <223>

<400> 67	
atg cca ttt gaa atc gta ttt gaa ggt gca aaa gag ttt gcc caa ctt	48
Met Pro Phe Glu Ile Val Phe Glu Gly Ala Lys Glu Phe Ala Gln Leu	
1 5 10 15	
ata gac acc gca agt aag tta ata gat gag gcc gcg ttt aaa gtt aca	96
Ile Asp Thr Ala Ser Lys Leu Ile Asp Glu Ala Ala Phe Lys Val Thr	
20 25 30	
gaa gat ggg ata agc atg agg gcc atg gat cca agt aga gtt gtc ctg	144
Glu Asp Gly Ile Ser Met Arg Ala Met Asp Pro Ser Arg Val Val Leu	
35 40 45	
att gac cta aat ctc ccg tca agc ata ttt agc aaa tat gaa gtt gtt	192
Ile Asp Leu Asn Leu Pro Ser Ser Ile Phe Ser Lys Tyr Glu Val Val	
50 55 60	
gaa cca gaa aca att gga gtt aac atg gac cac cta aag aag atc cta	240
Glu Pro Glu Thr Ile Gly Val Asn Met Asp His Leu Lys Lys Ile Leu	
65 70 75 80	

aag aga ggt aaa gca aag gac acc tta ata ctc aag aaa gga gag gaa Lys Arg Gly Lys Ala Lys Asp Thr Leu Ile Leu Lys Lys Gly Glu Glu	288
85 90 95	
aac ttc tta gag ata aca att caa gga act gca aca aga aca ttt aga Asn Phe Leu Glu Ile Thr Ile Gln Gly Thr Ala Thr Arg Thr Phe Arg	336
100 105 110	
gtt ccc cta ata gat gta gaa gag atg gaa gtt gac ctc cca gaa ctt Val Pro Leu Ile Asp Val Glu Glu Met Glu Val Asp Leu Pro Glu Leu	384
115 120 125	
cca ttc act gca aag gtt gta gtt ctt gga gaa gtc cta aaa gat gct Pro Phe Thr Ala Lys Val Val Val Leu Gly Glu Val Leu Lys Asp Ala	432
130 135 140	
gtt aaa gat gcc tct cta gtg agt gac agc ata aaa ttt att gcc agg Val Lys Asp Ala Ser Leu Val Ser Asp Ser Ile Lys Phe Ile Ala Arg	480
145 150 155 160	
gaa aat gaa ttt ata atg aag gca gag gga gaa acc cag gaa gtt gag Glu Asn Glu Phe Ile Met Lys Ala Glu Gly Glu Thr Gln Glu Val Glu	528
165 170 175	
ata aag cta act ctt gaa gat gag gga tta ttg gac atc gag gtt caa Ile Lys Leu Thr Leu Glu Asp Glu Gly Leu Leu Asp Ile Glu Val Gln	576
180 185 190	
gag gag aca aag agc gca tat gga gtc agc tat ctc tcc gac atg gtt Glu Glu Thr Lys Ser Ala Tyr Gly Val Ser Tyr Leu Ser Asp Met Val	624
195 200 205	
aaa gga ctt gga aag gcc gat gaa gtt aca ata aag ttt gga aat gaa Lys Gly Leu Gly Lys Ala Asp Glu Val Thr Ile Lys Phe Gly Asn Glu	672
210 215 220	
atg ccc atg caa atg gag tat tac att aga gat gaa gga aga ctt aca Met Pro Met Gln Met Glu Tyr Tyr Ile Arg Asp Glu Gly Arg Leu Thr	720
225 230 235 240	
ttc cta ctg gct cca aga gtt gaa gag tga Phe Leu Leu Ala Pro Arg Val Glu Glu	750
245	

<210> 68
 <211> 249
 <212> PRT
 <213> Pyrococcus furiosus

<400> 68

Met Pro Phe Glu Ile Val Phe Glu Gly Ala Lys Glu Phe Ala Gln Leu 1 5 10 15
Ile Asp Thr Ala Ser Lys Leu Ile Asp Glu Ala Ala Phe Lys Val Thr 20 25 30

Glu Asp Gly Ile Ser Met Arg Ala Met Asp Pro Ser Arg Val Val Leu
 35 40 45
 Ile Asp Leu Asn Leu Pro Ser Ser Ile Phe Ser Lys Tyr Glu Val Val
 50 55 60
 Glu Pro Glu Thr Ile Gly Val Asn Met Asp His Leu Lys Lys Ile Leu
 65 70 75 80
 Lys Arg Gly Lys Ala Lys Asp Thr Leu Ile Leu Lys Lys Gly Glu Glu
 85 90 95
 Asn Phe Leu Glu Ile Thr Ile Gln Gly Thr Ala Thr Arg Thr Phe Arg
 100 105 110
 Val Pro Leu Ile Asp Val Glu Glu Met Glu Val Asp Leu Pro Glu Leu
 115 120 125
 Pro Phe Thr Ala Lys Val Val Val Leu Gly Glu Val Leu Lys Asp Ala
 130 135 140
 Val Lys Asp Ala Ser Leu Val Ser Asp Ser Ile Lys Phe Ile Ala Arg
 145 150 155 160
 Glu Asn Glu Phe Ile Met Lys Ala Glu Gly Glu Thr Gln Glu Val Glu
 165 170 175
 Ile Lys Leu Thr Leu Glu Asp Glu Gly Leu Leu Asp Ile Glu Val Gln
 180 185 190
 Glu Glu Thr Lys Ser Ala Tyr Gly Val Ser Tyr Leu Ser Asp Met Val
 195 200 205
 Lys Gly Leu Gly Lys Ala Asp Glu Val Thr Ile Lys Phe Gly Asn Glu
 210 215 220
 Met Pro Met Gln Met Glu Tyr Tyr Ile Arg Asp Glu Gly Arg Leu Thr
 225 230 235 240
 Phe Leu Leu Ala Pro Arg Val Glu Glu
 245

<210> 69
 <211> 201
 <212> DNA
 <213> Sulfolobus acidocaldarius

<220>
 <221> CDS
 <222> (1)..(201)
 <223>

<400> 69
 atg gtg aag gta aag ttc aag tat aag ggt gaa gag aaa gaa gta gac
 Met Val Lys Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp
 1 5 10 15

48

act tca aag ata aag aag gtt tgg aga gta ggc aaa atg gtg tcc ttt	96
Thr Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Val Ser Phe	
20 25 30	
acc tat gac gac aat ggt aag aca ggt aga gga gct gta agc gag aaa	144
Thr Tyr Asp Asp Asn Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys	
35 40 45	
gat gct cca aaa gaa tta tta gac atg tta gca aga gca gaa aga gag	192
Asp Ala Pro Lys Glu Leu Leu Asp Met Leu Ala Arg Ala Glu Arg Glu	
50 55 60	
aag aaa taa	201
Lys Lys	
65	
<210> 70	
<211> 66	
<212> PRT	
<213> Sulfolobus acidocaldarius	
<400> 70	
Met Val Lys Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp	
1 5 10 15	
Thr Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Val Ser Phe	
20 25 30	
Thr Tyr Asp Asp Asn Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys	
35 40 45	
Asp Ala Pro Lys Glu Leu Leu Asp Met Leu Ala Arg Ala Glu Arg Glu	
50 55 60	
Lys Lys	
65	
<210> 71	
<211> 189	
<212> DNA	
<213> Sulfolobus solfataricus	
<220>	
<221> CDS	
<222> (1)..(189)	
<223>	
<400> 71	
gca acc gta aag ttc aag tac aaa ggc gaa gaa aaa gag gta gac atc	48
Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile	
1 5 10 15	
tcc aag atc aag aaa gta tgg cgt gtg ggc aag atg atc tcc ttc acc	96
Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr	
20 25 30	

tac gac gag ggc ggt ggc aag acc ggc cgt ggt gcg gta agc gaa aag 144
Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
35 40 45

gac gcg ccg aag gag ctg ctg cag atg ctg gag aag cag aaa aag 189
Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
50 55 60

<210> 72
<211> 63
<212> PRT
<213> *Sulfolobus solfataricus*

<400> 72

Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile
1 5 10 15

Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr
20 25 30

Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
35 40 45

Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
50 55 60

<210> 73
<211> 57
<212> PRT
<213> *Methanopyrus kandleri*

<400> 73

Val Ala Leu Val Tyr Asp Ala Glu Phe Val Gly Ser Glu Arg Glu Phe
1 5 10 15

Glu Glu Glu Arg Glu Thr Phe Leu Lys Gly Val Lys Ala Tyr Asp Gly
20 25 30

Val Leu Ala Thr Arg Tyr Leu Met Glu Arg Ser Ser Ser Ala Lys Asn
35 40 45

Asp Glu Glu Leu Leu Glu Leu His Gln
50 55

<210> 74
<211> 29
<212> PRT
<213> *Escherichia coli*

<400> 74

Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp Ile Arg
1 5 10 15

Arg Ile Gly Ala Ile Lys Asp Gly Asp Glu Val Val Gly

	20	25
--	----	----

<210> 75
 <211> 57
 <212> PRT
 <213> Methanopyrus kandleri

 <400> 75

Val	Pro	Ile	Asp	Glu	Lys	Glu	Glu	Arg	Ile	Leu	Glu	Ile	Leu	Arg	Glu
1				5					10					15	

Asn	Pro	Trp	Thr	Pro	His	Asp	Glu	Ile	Ala	Arg	Arg	Gly	Gly	Leu	Ser
			20					25					30		

Val	Ser	Glu	Val	Glu	Gly	Glu	Lys	Asp	Pro	Glu	Ser	Ser	Gly	Ile	Tyr
		35					40					45			

Ser	Leu	Trp	Ser	Arg	Val	Val	Val	Asn
	50					55		

<210> 76
 <211> 40
 <212> PRT
 <213> Escherichia coli

 <400> 76

Ile	Asp	Arg	Ile	Asp	Arg	Lys	Ile	Leu	Asn	Glu	Leu	Gln	Lys	Asp	Gly
1				5					10					15	

Arg	Arg	Ile	Ser	Asn	Glu	Leu	Ala	Lys	Arg	Val	Gly	Leu	Ser	Val	Ser
			20					25					30		

Thr	Val	Arg	Glu	Arg	Val	Arg	Arg
		35				40	

<210> 77
 <211> 40
 <212> PRT
 <213> Methanopyrus kandleri

 <400> 77

Leu	Lys	Leu	Gln	Asp	Arg	Tyr	Gly	Ile	Arg	Glu	Asp	Val	Ala	Leu	Cys
1				5					10					15	

Leu	Ala	Arg	Ala	Phe	Asp	Gly	Ser	Ile	Ser	Met	Ile	Ala	Thr	Thr	Pro
			20					25					30		

Tyr	Arg	Thr	Leu	Lys	Asp	Val	Cys
		35				40	

<210> 78
 <211> 15
 <212> PRT
 <213> Methanopyrus kandleri

<400> 78

Pro Asp Leu Thr Leu Glu Glu Ala Lys Ser Val Asn Arg Thr Leu
1 5 10 15

<210> 79

<211> 30

<212> PRT

<213> Methanopyrus kandleri

<400> 79

Ala Thr Leu Ile Asp Glu His Gly Leu Ser Pro Ala Asp Ala Ala Asp
1 5 10 15

Glu Leu Ile Glu His Phe Glu Ser Ile Ala Gly Ile Leu Ala
20 25 30

<210> 80

<211> 11

<212> PRT

<213> Methanopyrus kandleri

<400> 80

Thr Asp Leu Glu Glu Ile Glu Arg Met Tyr Glu
1 5 10

<210> 81

<211> 15

<212> PRT

<213> Methanopyrus kandleri

<400> 81

Glu Gly Arg Leu Ser Glu Glu Ala Tyr Arg Ala Ala Val Glu Ile
1 5 10 15

<210> 82

<211> 57

<212> PRT

<213> Thermococcus kodakaraensis

<400> 82

Ala Glu Leu Thr Lys Lys Glu Gly Val Gly Arg Lys Thr Ala Glu Arg
1 5 10 15

Leu Leu Arg Ala Phe Gly Asn Pro Glu Arg Val Lys Gln Leu Ala Arg
20 25 30

Glu Phe Glu Ile Glu Lys Leu Ala Ser Val Glu Gly Val Gly Glu Arg
35 40 45

Val Leu Arg Ser Leu Val Pro Gly Tyr
50 55

<210> 83
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 83

Ala Ser Leu Ile Ser Ile Arg Gly Ile Asp Arg Glu Arg Ala Glu Arg
1 5 10 15

Leu Leu Lys Lys Tyr Gly Gly Tyr Ser Lys Val
20 25

<210> 84
<211> 10
<212> PRT
<213> Methanopyrus kandleri

<400> 84

Arg Glu Ala Gly Val Glu Glu Leu Arg Glu
1 5 10

<210> 85
<211> 13
<212> PRT
<213> Methanopyrus kandleri

<400> 85

Asp Gly Leu Thr Asp Ala Gln Ile Arg Glu Leu Lys Gly
1 5 10

<210> 86
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 86

Leu Lys Thr Leu Glu Ser Ile Val Gly Asp Leu Glu Lys Ala Asp Glu
1 5 10 15

Leu Lys Arg Lys Tyr Gly Ser Ala Ser Ala Val
20 25

<210> 87
<211> 10
<212> PRT
<213> Methanopyrus kandleri

<400> 87

Arg Arg Leu Pro Val Glu Glu Leu Arg Glu
1 5 10

<210> 88
<211> 13
<212> PRT
<213> Methanopyrus kandleri

<400> 88

Leu Gly Phe Ser Asp Asp Glu Ile Ala Glu Ile Lys Gly
1 5 10

<210> 89
<211> 28
<212> PRT
<213> Methanopyrus kandleri

<400> 89

Ile Pro Lys Lys Leu Arg Glu Ala Phe Asp Leu Glu Thr Ala Ala Glu
1 5 10 15

Leu Tyr Glu Arg Tyr Gly Ser Leu Lys Glu Ile Gly
20 25

<210> 90
<211> 10
<212> PRT
<213> Methanopyrus kandleri

<400> 90

Arg Arg Leu Ser Tyr Asp Asp Leu Leu Glu
1 5 10

<210> 91
<211> 15
<212> PRT
<213> Methanopyrus kandleri

<400> 91

Leu Gly Ala Thr Pro Lys Ala Ala Ala Glu Ile Lys Gly Pro Glu
1 5 10 15

<210> 92
<211> 28
<212> PRT
<213> Methanopyrus kandleri

<400> 92

Lys Phe Leu Leu Asn Ile Glu Gly Val Gly Pro Lys Leu Ala Glu Arg
1 5 10 15

Ile Leu Glu Ala Val Asp Tyr Asp Leu Glu Arg Leu
20 25

<210> 93

<211> 26
<212> PRT
<213> Methanopyrus kandleri

<400> 93

Ala Ser Leu Asn Pro Glu Glu Leu Ala Glu Val Glu Gly Leu Gly Glu
1 5 10 15

Glu Leu Ala Glu Arg Val Val Tyr Ala Ala
20 25

<210> 94
<211> 40
<212> PRT
<213> Methanopyrus kandleri

<400> 94

Trp Lys Glu Trp Leu Glu Arg Lys Val Gly Glu Gly Arg Ala Arg Arg
1 5 10 15

Leu Ile Glu Tyr Phe Gly Ser Ala Gly Glu Val Gly Lys Leu Val Glu
20 25 30

Asn Ala Glu Val Ser Lys Leu Leu
35 40

<210> 95
<211> 15
<212> PRT
<213> Methanopyrus kandleri

<400> 95

Val Pro Gly Ile Gly Asp Glu Ala Val Ala Arg Leu Val Pro Gly
1 5 10 15

<210> 96
<211> 28
<212> PRT
<213> Methanopyrus kandleri

<400> 96

Tyr Lys Thr Leu Arg Asp Ala Gly Leu Thr Pro Ala Glu Ala Glu Arg
1 5 10 15

Val Leu Lys Arg Tyr Gly Ser Val Ser Lys Val Gln
20 25

<210> 97
<211> 10
<212> PRT
<213> Methanopyrus kandleri

<400> 97

Glu Gly Ala Thr Pro Asp Glu Leu Arg Glu
1 5 10

<210> 98
<211> 13
<212> PRT
<213> Methanopyrus kandleri

<400> 98

Leu Gly Leu Gly Asp Ala Lys Ile Ala Arg Ile Leu Gly
1 5 10

<210> 99
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 99

Leu Arg Ser Leu Val Asn Lys Arg Leu Asp Val Asp Thr Ala Tyr Glu
1 5 10 15

Leu Lys Arg Arg Tyr Gly Ser Val Ser Ala Val
20 25

<210> 100
<211> 10
<212> PRT
<213> Methanopyrus kandleri

<400> 100

Arg Lys Ala Pro Val Lys Glu Leu Arg Glu
1 5 10

<210> 101
<211> 15
<212> PRT
<213> Methanopyrus kandleri

<400> 101

Leu Gly Leu Ser Asp Arg Lys Ile Ala Arg Ile Lys Gly Ile Pro
1 5 10 15

<210> 102
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 102

Glu Thr Met Leu Gln Val Arg Gly Met Ser Val Glu Lys Ala Glu Arg
1 5 10 15

Leu Leu Glu Arg Phe Asp Thr Trp Thr Lys Val
20 25

<210> 103
<211> 9
<212> PRT
<213> Methanopyrus kandleri

<400> 103

Lys Glu Ala Pro Val Ser Glu Leu Val
1 5

<210> 104
<211> 16
<212> PRT
<213> Methanopyrus kandleri

<400> 104

Val Pro Gly Val Gly Leu Ser Leu Val Lys Glu Ile Lys Ala Gln Val
1 5 10 15

<210> 105
<211> 27
<212> PRT
<213> Methanopyrus kandleri

<400> 105

Lys Ala Leu Leu Asp Val Lys Gly Val Ser Pro Glu Leu Ala Asp Arg
1 5 10 15

Leu Val Glu Glu Leu Gly Ser Pro Tyr Arg Val
20 25

<210> 106
<211> 9
<212> PRT
<213> Methanopyrus kandleri

<400> 106

Leu Thr Ala Lys Lys Ser Asp Leu Met
1 5

<210> 107
<211> 16
<212> PRT
<213> Methanopyrus kandleri

<400> 107

Val Glu Arg Val Gly Pro Lys Leu Ala Glu Arg Ile Arg Ala Ala Gly
1 5 10 15

<210> 108

<211> 27
<212> PRT
<213> Escherichia coli

<400> 108

Lys Glu Leu Ile Lys Thr Asn Gly Val Gly Pro Lys Leu Ala Leu Ala
1 5 10 15

Ile Leu Ser Gly Met Ser Ala Gln Gln Phe Val
20 25

<210> 109
<211> 26
<212> PRT
<213> Escherichia coli

<400> 109

Asn Ala Val Glu Arg Glu Glu Val Gly Ala Leu Pro Gly Ile Gly Lys
1 5 10 15

Lys Thr Ala Glu Arg Leu Ile Val Glu Met
20 25

<210> 110
<211> 57
<212> PRT
<213> Homo sapiens

<400> 110

Ala Glu Ala Lys Lys Leu Pro Gly Val Gly Thr Lys Ile Ala Glu Lys
1 5 10 15

Ile Asp Glu Phe Leu Ala Thr Gly Lys Leu Arg Lys Leu Glu Lys Ile
20 25 30

Arg Gln Asp Asp Thr Ser Ser Ser Ile Val Ser Gly Ile Gly Pro Ser
35 40 45

Ala Ala Arg Lys Phe Val Asp Glu Gly
50 55

<210> 111
<211> 27
<212> PRT
<213> Escherichia coli

<400> 111

Leu Glu Val Met Glu Val Pro Gly Val Gly Pro Lys Thr Ala Arg Gly
1 5 10 15

Leu Tyr Glu Ala Leu Gly Ile Asp Ser Leu Glu
20 25

<210> 112
 <211> 12
 <212> PRT
 <213> Escherichia coli

<400> 112

Lys Leu Lys Glu Ala Leu Glu Arg Gly Asp Leu Leu
 1 5 10

<210> 113
 <211> 16
 <212> PRT
 <213> Escherichia coli

<400> 113

Leu Lys Gly Phe Gly Ala Lys Lys Ala Glu Arg Ile Lys Glu Gly Leu
 1 5 10 15

<210> 114
 <211> 30
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 114
 agagcttgag gagagcagga aaggtggaac 30

<210> 115
 <211> 24
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 115
 tgcagagcga ttattcagga atgc 24

<210> 116
 <211> 30
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 116
 acaagggcta ctggttgccg atttttattg 30

<210> 117
 <211> 27
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 117
 gggactggcc tcagaggaaa cttcagg 27

<210> 118
 <211> 30
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 118
 acaagggcta ctggttgccg attttttattg 30

<210> 119
 <211> 28
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 119
 cctgcatttg tggggtgaat tccttgcc 28

<210> 120
 <211> 189
 <212> DNA
 <213> artificial sequence

<220>
 <223> Synthetic Sso7d gene

<220>
 <221> CDS
 <222> (1)..(189)
 <223>

<400> 120
 gca acc gta aag ttc aag tac aaa ggc gaa gaa aaa gag gta gac atc 48
 Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile
 1 5 10 15

tcc aag atc aag aaa gta tgg cgt gtg ggc aag atg atc tcc ttc acc 96
 Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr
 20 25 30

tac gac gag ggc ggt ggc aag acc ggc cgt ggt gcg gta agc gaa aag 144
 Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
 35 40 45

gac gcg ccg aag gag ctg ctg cag atg ctg gag aag cag aaa aag 189
 Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys

50 55 60

<210> 121
 <211> 63
 <212> PRT
 <213> artificial sequence

<220>
 <223> Synthetic Sso7d gene

<400> 121

Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu Glu Lys Glu Val Asp Ile
 1 5 10 15

Ser Lys Ile Lys Lys Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr
 20 25 30

Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys
 35 40 45

Asp Ala Pro Lys Glu Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
 50 55 60

<210> 122
 <211> 1899
 <212> DNA
 <213> artificial sequence

<220>
 <223> The DNA sequence encoding the Sso7d-ATAq fusion protein

<220>
 <221> CDS
 <222> (1)..(1899)
 <223>

<400> 122

atg att acg aat tcg agc gca acc gta aag ttc aag tac aaa ggc gaa 48
 Met Ile Thr Asn Ser Ser Ala Thr Val Lys Phe Lys Tyr Lys Gly Glu
 1 5 10 15

gaa aaa gag gta gac atc tcc aag atc aag aaa gta tgg cgt gtg ggc 96
 Glu Lys Glu Val Asp Ile Ser Lys Ile Lys Lys Val Trp Arg Val Gly
 20 25 30

aag atg atc tcc ttc acc tac gac gag ggc ggt ggc aag acc ggc cgt 144
 Lys Met Ile Ser Phe Thr Tyr Asp Glu Gly Gly Gly Lys Thr Gly Arg
 35 40 45

ggt gcg gta agc gaa aag gac gcg ccg aag gag ctg ctg cag atg ctg 192
 Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu Leu Leu Gln Met Leu
 50 55 60

gag aag cag aaa aag ggc ggc ggt gtc act agt ccc aag gcc ctg gag 240
 Glu Lys Gln Lys Lys Gly Gly Gly Val Thr Ser Pro Lys Ala Leu Glu
 65 70 75 80

gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc ttt gtg ctt Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu 85 90 95	288
tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg gcc gcc gcc Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Ala 100 105 110	336
agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa gcc ctc agg Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg 115 120 125	384
gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg agc gtt ctg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu 130 135 140	432
gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac ccc atg ctc Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu 145 150 155 160	480
ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag ggg gtg gcc Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly Val Ala 165 170 175	528
cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag cgg gcc gcc Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg Ala Ala 180 185 190	576
ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt gag ggg gag Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu Gly Glu 195 200 205	624
gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc ctt tcc gct Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala 210 215 220	672
gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac gtg gcc tat Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr 225 230 235 240	720
ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc cgc ctc gag Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu 245 250 255	768
gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc aac tcc cgg Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg 260 265 270	816
gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt ccc gcc atc Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile 275 280 285	864
ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc gcc gtc ctg Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu 290 295 300	912

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Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr	
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cgg gag ctc acc aag ctg aag agc acc tac att gac ccc ttg ccg gac	1008
Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp	
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ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc aac cag acg	1056
Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr	
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gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac ctc cag aac	1104
Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn	
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Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile	
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gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc cag ata gag	1200
Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu	
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Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val	
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Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp Met Phe	
420 425 430	
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Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala Ala Lys	
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Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser	
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Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile Glu Arg	
465 470 475 480	
tac ttt cag agc ttc ccc aag gtg cgg gcc tgg att gag aag acc ctg	1488
Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu	
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Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg	
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cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg cgg gag gcg	1584
Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg Glu Ala	
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Pro	Lys	Glu	Arg	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu	Val	Met		
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Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Ile		
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Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Gly	Ile	Asp	Gly	Arg	Gly	Gly		
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Lys	Met	Ile	Ser	Phe	Thr	Tyr	Asp	Glu	Gly	Gly	Gly	Lys	Thr	Gly	Arg		
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Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	Leu	Ala	Leu	Ala	Ala	Ala		
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Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg
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 Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly Val Ala
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 Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu Ser Ala
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 Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr
 225 230 235 240
 Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu
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 Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg
 260 265 270
 Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile
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 Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu
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 Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr
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 Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp
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 Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr
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 Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn
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 Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile
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 Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu
 385 390 395 400
 Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val

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Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile	Glu	Arg
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Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu
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Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg
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Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu	Glu	Ala
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Pro	Lys	Glu	Arg	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu	Val	Met
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Gly	Ala	Val	Ser	Glu	Lys	Asp	Ala	Pro	Lys	Glu	Leu	Leu	Gln	Met	Leu		
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Glu	Lys	Gln	Lys	Lys	Gly	Gly	Gly	Val	Thr	Ser	Gly	Met	Leu	Pro	Leu		
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Phe	Glu	Pro	Lys	Gly	Arg	Val	Leu	Leu	Val	Asp	Gly	His	His	Leu	Ala		
				85				90						95			
tac	cgc	acc	ttc	cac	gcc	ctg	aag	ggc	ctc	acc	acc	agc	cgg	ggg	gag		336
Tyr	Arg	Thr	Phe	His	Ala	Leu	Lys	Gly	Leu	Thr	Thr	Ser	Arg	Gly	Glu		
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ccg	gtg	cag	gag	gtc	tac	ggc	ttc	gcc	aag	agc	ctc	ctc	aag	gcc	ctc		384
Pro	Val	Gln	Ala	Val	Tyr	Gly	Phe	Ala	Lys	Ser	Leu	Leu	Lys	Ala	Leu		
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aag	gag	gac	ggg	gac	gag	gtg	atc	gtg	gtc	ttt	gac	gcc	aag	gcc	ccc		432
Lys	Glu	Asp	Gly	Asp	Ala	Val	Ile	Val	Val	Phe	Asp	Ala	Lys	Ala	Pro		
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Ser	Phe	Arg	His	Glu	Ala	Tyr	Gly	Gly	Tyr	Lys	Ala	Gly	Arg	Ala	Pro		
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Thr	Pro	Glu	Asp	Phe	Pro	Arg	Gln	Leu	Ala	Leu	Ile	Lys	Glu	Leu	Val		
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Asp	Leu	Leu	Gly	Leu	Ala	Arg	Leu	Glu	Val	Pro	Gly	Tyr	Glu	Ala	Asp		
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Asp	Val	Leu	Ala	Ser	Leu	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu		
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gtc	cgc	atc	ctc	acc	gcc	gac	aaa	gac	ctt	tac	cag	ctc	ctt	tcc	gac		672
Val	Arg	Ile	Leu	Thr	Ala	Asp	Lys	Asp	Leu	Tyr	Gln	Leu	Leu	Ser	Asp		
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gcc ctg acc ggg gac gag tcc gac aac ctt ccc ggg gtc aag ggc atc Ala Leu Thr Gly Asp Glu Ser Asp Asn Leu Pro Gly Val Lys Gly Ile 260 265 270	816
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gcc ctc ctc aag aac ctg gac cgg ctg aag ccc gcc atc cgg gag aag Ala Leu Leu Lys Asn Leu Asp Arg Leu Lys Pro Ala Ile Arg Glu Lys 290 295 300	912
atc ctg gcc cac atg gac gat ctg aag ctc tcc tgg gac ctg gcc aag Ile Leu Ala His Met Asp Asp Leu Lys Leu Ser Trp Asp Leu Ala Lys 305 310 315 320	960
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ccc gac cgg gag agg ctt agg gcc ttt ctg gag agg ctt gag ttt ggc Pro Asp Arg Glu Arg Leu Arg Ala Phe Leu Glu Arg Leu Glu Phe Gly 340 345 350	1056
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gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc ttt gtg ctt Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu 370 375 380	1152
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gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac ccc atg ctc Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu 435 440 445	1344
ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag ggg gtg gcc	1392

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Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu	Gly	Glu	495	
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Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	Leu	Pro	Asp	620	
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Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	655	
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atc	ccc	gtc	cgc	acc	ccg	ctt	ggg	cag	agg	atc	cgc	cgg	gcc	ttc	atc	2016	
Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Ile	670	
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Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	Trp	Met	Phe			
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Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys			
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Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp			
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 Leu Trp Glu Lys Tyr Gly Leu Arg Pro Asp Gln Trp Ala Asp Tyr Arg
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 Ala Leu Thr Gly Asp Glu Ser Asp Asn Leu Pro Gly Val Lys Gly Ile
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 Gly Glu Lys Thr Ala Arg Lys Leu Leu Glu Glu Trp Gly Ser Leu Glu
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 Ile Leu Ala His Met Asp Asp Leu Lys Leu Ser Trp Asp Leu Ala Lys
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 Val Arg Thr Asp Leu Pro Leu Glu Val Asp Phe Ala Lys Arg Arg Glu
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 Ser Leu Leu His Glu Phe Gly Leu Leu Glu Ser Pro Lys Ala Leu Glu
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 Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe Val Leu
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 Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala Ala Ala
 385 390 395 400
 Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala Leu Arg
 405 410 415
 Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser Val Leu
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 Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro Met Leu
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 Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val Ala Tyr
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Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg Leu Glu
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Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn Ser Arg
 545 550 555 560

Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro Ala Ile
 565 570 575

Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala Val Leu
 580 585 590

Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu Gln Tyr
 595 600 605

Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu Pro Asp
 610 615 620

Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn Gln Thr
 625 630 635 640

Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn
 645 650 655

Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala Phe Ile
 660 665 670

Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln Ile Glu
 675 680 685

Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile Arg Val
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Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp Met Phe
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Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala Ala Lys
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Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser
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Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile Glu Arg
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Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu
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Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg
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Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg Glu Ala
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Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala Ala Asp
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Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu Glu Met
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 Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu Glu Ala
 850 855 860
 Pro Lys Glu Arg Ala Glu Ala Val Ala Arg Leu Ala Lys Glu Val Met
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 Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val Gly Ile
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 Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
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 act ttt aga cca tac att tac gct ctt ctc agg gat gat tca aag att 144
 Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
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 gaa gaa gtt aag aaa ata acg ggg gaa agg cat gga aag att gtg aga 192
 Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
 50 55 60
 att gtt gat gta gag aag gtt gag aaa aag ttt ctc ggc aag cct att 240
 Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
 65 70 75 80
 acc gtg tgg aaa ctt tat ttg gaa cat ccc caa gat gtt ccc act att 288
 Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
 85 90 95
 aga gaa aaa gtt aga gaa cat cca gca gtt gtg gac atc ttc gaa tac 336

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Asp	Ile	Pro	Phe	Ala	Lys	Arg	Tyr	Leu	Ile	Asp	Lys	Gly	Leu	Ile	Pro		
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Met	Glu	Gly	Glu	Glu	Glu	Leu	Lys	Ile	Leu	Ala	Phe	Asp	Ile	Glu	Thr		
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Leu	Tyr	His	Glu	Gly	Glu	Glu	Phe	Gly	Lys	Gly	Pro	Ile	Ile	Met	Ile		
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Tyr	Thr	Leu	Glu	Ala	Val	Tyr	Glu	Ala	Ile	Phe	Gly	Lys	Pro	Lys	Glu		
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Lys	Val	Tyr	Ala	Asp	Glu	Ile	Ala	Lys	Ala	Trp	Glu	Ser	Gly	Glu	Asn		
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ctt	gag	aga	gtt	gcc	aaa	tac	tcg	atg	gaa	gat	gca	aag	gca	act	tat		960
Leu	Glu	Arg	Val	Ala	Lys	Tyr	Ser	Met	Glu	Asp	Ala	Lys	Ala	Thr	Tyr		
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Glu	Leu	Gly	Lys	Glu	Phe	Leu	Pro	Met	Glu	Ile	Gln	Leu	Ser	Arg	Leu		

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Val	Gly	Gln	Pro	Leu	Trp	Asp	Val	Ser	Arg	Ser	Ser	Thr	Gly	Asn	Leu			
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cca	aac	aag	cca	agt	gaa	gag	gag	tat	caa	aga	agg	ctc	agg	gag	agc	1152		
Pro	Asn	Lys	Pro	Ser	Glu	Glu	Glu	Tyr	Gln	Arg	Arg	Leu	Arg	Glu	Ser			
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Tyr	Thr	Gly	Gly	Phe	Val	Lys	Glu	Pro	Glu	Lys	Gly	Leu	Trp	Glu	Asn			
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Ile	Val	Tyr	Leu	Asp	Phe	Arg	Ala	Leu	Tyr	Pro	Ser	Ile	Ile	Ile	Thr			
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cac	aat	ggt	tct	ccc	gat	act	cta	aat	ctt	gag	gga	tgc	aag	aac	tat	1296		
His	Asn	Val	Ser	Pro	Asp	Thr	Leu	Asn	Leu	Glu	Gly	Cys	Lys	Asn	Tyr			
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gat	atc	gct	cct	caa	gta	ggc	cac	aag	ttc	tgc	aag	gac	atc	cct	ggt	1344		
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Lys	Thr	Lys	Met	Lys	Glu	Thr	Leu	Ala	Asn	Ser	Phe	Tyr	Gly	Tyr	Tyr			
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ctg	ctg	cag	atg	ctg	gag	aag	cag	aaa	aag	tga	2481
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Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
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Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
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Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
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Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
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Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
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Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys

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Gly	Asp	Gly	Pro	Ile	Ser	Asn	Arg	Ala	Ile	Leu	Ala	Glu	Glu	Tyr	Asp			
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Pro	Lys	Lys	His	Lys	Tyr	Asp	Ala	Glu	Tyr	Tyr	Ile	Glu	Asn	Gln	Val			
705					710					715					720			
Leu	Pro	Ala	Val	Leu	Arg	Ile	Leu	Glu	Gly	Phe	Gly	Tyr	Arg	Lys	Glu			
				725					730					735				
Asp	Leu	Arg	Tyr	Gln	Lys	Thr	Arg	Gln	Val	Gly	Leu	Thr	Ser	Trp	Leu			
			740					745					750					
Asn	Ile	Lys	Lys	Ser	Gly	Thr	Gly	Gly	Gly	Gly	Ala	Thr	Val	Lys	Phe			
		755					760					765						
Lys	Tyr	Lys	Gly	Glu	Glu	Lys	Glu	Val	Asp	Ile	Ser	Lys	Ile	Lys	Lys			
	770					775					780							

Val Trp Arg Val Gly Lys Met Ile Ser Phe Thr Tyr Asp Glu Gly Gly
785 790 795 800

Gly Lys Thr Gly Arg Gly Ala Val Ser Glu Lys Asp Ala Pro Lys Glu
805 810 815

Leu Leu Gln Met Leu Glu Lys Gln Lys Lys
820 825

<210> 128
<211> 1905
<212> DNA
<213> artificial sequence

<220>
<223> The DNA sequence encoding the Sac7d-ATAq fusion protein

<400> 128
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gacacttcaa agataaagaa ggtttggaga gtaggcaaaa tgggtgtcctt tacctatgac 120
gacaatggta agacaggtag aggagctgta agcgagaaag atgctccaaa agaattatta 180
gacatgttag caagagcaga aagagagaag aaaggcggcg gtgtcactag cccaaggcc 240
ctggaggagg cccctggcc cccgccgga ggggccttcg tgggctttgt gctttccgc 300
aaggagccca tgtgggcca tcttctggcc ctggccgccg ccaggggggg ccgggtccac 360
cgggcccccg agccttataa agccctcagg gacctgaagg aggcgcgggg gcttctcgcc 420
aaagacctga gcgttctggc cctgagggaa ggccttggcc tcccgccccg cgacgacccc 480
atgctcctcg cctacctct ggacccttcc aacaccaccc ccgagggggg ggcccggcgc 540
tacggcgggg agtggacgga ggaggcgggg gagcgggccg ccctttccga gaggctcttc 600
gccaacctgt gggggaggct tgagggggag gagaggctcc tttggcttta ccgggaggtg 660
gagaggcccc tttccgctgt cctggccac atggaggcca cgggggtgcg cctggacgtg 720
gcctatctca gggccttgct cctggaggtg gccgaggaga tcgcccgcct cgaggccgag 780
gtcttccgcc tggccggcca ccccttcaac ctcaactccc gggaccagct ggaaagggtc 840
ctctttgacg agctagggct tcccgccatc ggcaagacgg agaagaccgg caagcgctcc 900
accagcgccg ccgtcctgga ggcctccgc gaggcccacc ccatcggtga gaagatcctg 960
cagtaccggg agctcaccaa gctgaagagc acctacattg accccttgcc ggacctcatc 1020
caccacagga cgggccgcct ccacacccgc ttcaaccaga cggccacggc cacgggcagg 1080
ctaagtagct ccgatcccaa cctccagaac atccccgtcc gcaccccgct tgggcagagg 1140
atccgcccgg ccttcatcgc cgaggagggg tggctattgg tggccctgga ctatagccag 1200

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atagagctca gggtgctggc ccacctctcc ggcgacgaga acctgatccg ggtcttccag 1260
gaggggacggg acatccacac ggagaccgcc agctggatgt tcggcgctccc ccgggaggcc 1320
gtggaccccc tgatgcgccg ggcggccaag accatcaact tcggggctcct ctacggcatg 1380
tcggcccacc gcctctccca ggagctagcc atcccttacg aggaggccca ggccttcatt 1440
gagcgctact ttcagagctt cccaaggtg cgggcctgga ttgagaagac cctggaggag 1500
ggcaggaggc gggggtacgt ggagaccctc ttcggccgcc gccgctacgt gccagaccta 1560
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gaaatggggg ccaggatgct ccttcaggtc cacgacgagc tggtcctcga ggccccaaaa 1740
gagagggcgg aggccgtggc ccggctggcc aaggagggtca tggagggggg gtatcccctg 1800
gccgtgcccc tggaggtgga ggtggggata ggggaggact ggctctccgc caaggagggc 1860
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<210> 129

<211> 634

<212> PRT

<213> artificial sequence

<220>

<223> The amino acid sequence of the Sac7d-ATag fusion protein

<400> 129

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Glu Lys Glu Val Asp Thr Ser Lys Ile Lys Lys Val Trp Arg Val Gly
20          25          30
Lys Met Val Ser Phe Thr Tyr Asp Asp Asn Gly Lys Thr Gly Arg Gly
35          40          45
Ala Val Ser Glu Lys Asp Ala Pro Lys Glu Leu Leu Asp Met Leu Ala
50          55          60
Arg Ala Glu Arg Glu Lys Lys Gly Gly Gly Val Thr Ser Pro Lys Ala
65          70          75          80
Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe
85          90          95
Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala
100         105         110
Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala

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115					120					125					
Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ser
	130					135					140				
Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	Gly	Asp	Asp	Pro
145					150					155					160
Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly
				165					170					175	
Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	Arg
			180					185					190		
Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	Glu
		195					200					205			
Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	Leu
	210					215					220				
Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	Val
225					230					235					240
Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	Glu	Ile	Ala	Arg
				245					250					255	
Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn
		260						265					270		
Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	Leu	Gly	Leu	Pro
		275					280					285			
Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala
	290					295					300				
Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu
305					310					315					320
Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	Leu
				325					330					335	
Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn
			340					345					350		
Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu
		355					360					365			
Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala
	370					375					380				
Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln
385					390					395					400
Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile
				405					410					415	
Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	Trp

420					425					430						
Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	
435					440					445						
Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	
450					455					460						
Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	Ile	
465					470					475					480	
Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	
					485					490					495	
Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	
					500					505					510	
Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	Arg	
					515					520					525	
Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	
					530					535					540	
Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Glu	
545					550					555					560	
Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val	Leu	
					565					570					575	
Glu	Ala	Pro	Lys	Glu	Arg	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys	Glu	
					580					585					590	
Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	
					595					600					605	
Gly	Ile	Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Gly	Ile	Asp	Gly	Arg	
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Gly	Gly	Gly	Gly	His	His	His	His	His	His	His	His	His	His	His	His	
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<210> 130
 <211> 1965
 <212> DNA
 <213> artificial sequence

<220>
 <223> The DNA sequence encoding the PL-delta Tag fusion protein

<400> 130	
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gaggtagaca tctccaagat caagaaagta tggcgtgtgg gcaagatgat ctcttcacc	180
tacgacgagg gcggtggcaa gaccggccgt ggtgcggtaa gcgaaaagga cgcgccgaag	240

gagctgctgc agatgctgga gaagcagaaa aagggcgggcg gtgtcaccag tcccaaggcc	300
ctggaggagg cccctggcc cccgccggaa ggggccttcg tgggctttgt gctttccgc	360
aaggagccca tgtgggccga tcttctggcc ctggccgccg ccaggggggg ccgggtccac	420
cgggcccccg agccttataa agccctcagg gacctgaagg aggcgcgggg gcttctcgcc	480
aaagacctga gcgttctggc cctgaggga ggccttggcc tcccgcccgg cgacgacccc	540
atgctcctcg cctacctcct ggacccttcc aacaccaccc ccgagggggg ggcccggcgc	600
tacggcgggg agtggacgga ggaggcgggg gagcgggccg ccctttccga gaggctcttc	660
gccaacctgt gggggaggct tgagggggag gagaggctcc tttggcttta ccgggaggtg	720
gagaggcccc tttccgctgt cctggcccac atggaggcca cgggggtgcg cctggacgtg	780
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accagcgccg ccgtcctgga ggcctccgc gaggcccacc ccacgtgga gaagatcctg	1020
cagtaccggg agctcaccaa gctgaagagc acctacattg accccttgcc ggacctcatc	1080
caccccagga cgggccgcct ccacacccgc ttcaaccaga cggccacggc cacgggcagg	1140
ctaagtagct ccgatcccaa cctccagaac atccccgtcc gcaccccgtc tgggcagagg	1200
atccgccggg ccttcacgc cgaggagggg tggctattgg tggccctgga ctatagccag	1260
atagagctca gggtgctggc ccacctctcc ggcgacgaga acctgatccg ggtcttccag	1320
gaggggcggg acatccacac ggagaccgcc agctggatgt tcggcgtccc ccgggaggcc	1380
gtggaccccc tgatgcgccg ggcggccaag accatcaact tcggggtcct ctacggcatg	1440
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gagcgctact ttcagagctt cccaagggtg cgggcctgga ttgagaagac cctggaggag	1560
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gagagggcgg aggccgtggc ccggctggcc aaggagggtca tggagggggg gtatcccctg	1860
gccgtgcccc tggaggtgga ggtggggata ggggaggact ggctctccgc caaggagggc	1920

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1965

<210> 131

<211> 654

<212> PRT

<213> artificial sequence

<220>

<223> The amino acid sequence of PL- delta Taq fusion protein

<400> 131

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Lys	Lys	Lys	Lys	Lys	Gly	Gly	Gly	Val	Thr	Ser	Gly	Ala	Thr	Val	Lys	
			20					25					30			
Phe	Lys	Tyr	Lys	Gly	Glu	Glu	Lys	Glu	Val	Asp	Ile	Ser	Lys	Ile	Lys	
		35					40					45				
Lys	Val	Trp	Arg	Val	Gly	Lys	Met	Ile	Ser	Phe	Thr	Tyr	Asp	Glu	Gly	
	50					55					60					
Gly	Gly	Lys	Thr	Gly	Arg	Gly	Ala	Val	Ser	Glu	Lys	Asp	Ala	Pro	Lys	
65					70					75					80	
Glu	Leu	Leu	Gln	Met	Leu	Glu	Lys	Gln	Lys	Lys	Gly	Gly	Gly	Val	Thr	
			85					90						95		
Ser	Pro	Lys	Ala	Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala	
			100					105					110			
Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	
		115					120					125				
Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	
	130					135					140					
Pro	Tyr	Lys	Ala	Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	
145					150					155					160	
Lys	Asp	Leu	Ser	Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	
			165						170					175		
Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	
			180					185					190			
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	
		195					200					205				
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	
	210					215					220					
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	
225					230					235					240	

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val
 245 250 255
 Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu
 260 265 270
 Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro
 275 280 285
 Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu
 290 295 300
 Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser
 305 310 315 320
 Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val
 325 330 335
 Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr
 340 345 350
 Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His
 355 360 365
 Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser
 370 375 380
 Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg
 385 390 395 400
 Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu
 405 410 415
 Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp
 420 425 430
 Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu
 435 440 445
 Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu
 450 455 460
 Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met
 465 470 475 480
 Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala
 485 490 495
 Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala
 500 505 510
 Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu
 515 520 525
 Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val
 530 535 540

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val
 545 550 555 560
 Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe
 565 570 575
 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp
 580 585 590
 Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala Arg
 595 600 605
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu
 610 615 620
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Gly
 625 630 635 640
 Ile Asp Gly Arg Gly Gly Gly Gly His His His His His His
 645 650

<210> 132
 <211> 20
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 132
 cctgctctgc cgcttcacgc 20

<210> 133
 <211> 20
 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 133
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<210> 134
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 <212> DNA
 <213> artificial sequence

<220>
 <223> primer

<400> 134
 tgacggagga taacgccagc ag 22

<210> 135
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<220>
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<210> 141
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 <212> DNA
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<220>
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<400> 141
 cagcgggtgct gactgaatca tgg 23

<210> 142
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 <212> DNA
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<220>
 <223> primer

<400> 142
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<210> 143
 <211> 22
 <212> DNA
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<220>
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<400> 143
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<210> 144
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 ccacctcatc ctgggcacc 19

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